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Field Tests of Industrial Stoker Coal-Fired Boilers for Emissions Control and Efficiency Improvement - Site J (Data Supplement)

KVB, Inc.
Minneapolis, MN

Prepared for

Industrial Environmental Research Lab.
Research Triangle Park, NC

May 80

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Industrial Environmental Research Laboratory
Research Triangle Park NC 27711

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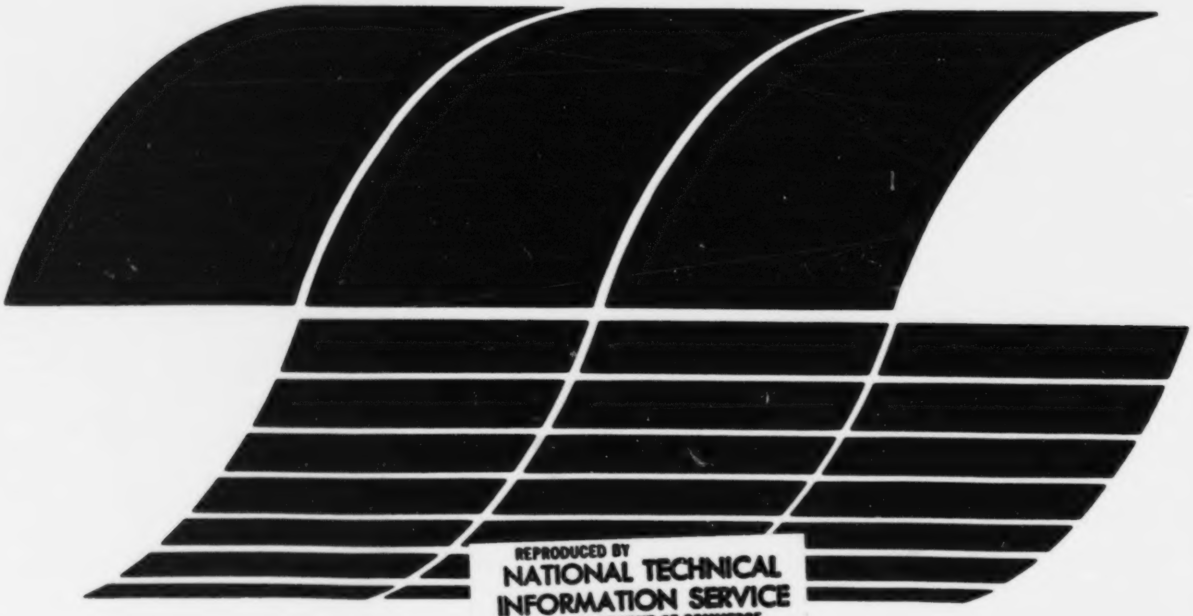

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16. ABSTRACT
The Data Supplement is a compilation of test data presented in greater detail than was practical in the final technical report. It is intended to provide the necessary details to other researchers who are interested in performing their own analysis. Readers are referred to the contract final report for information as to objectives, description of facility tested and coals fired, test equipment and procedures, interpretations, and conclusions. The final technical report also contains data summaries not found in this Supplement. The Supplement contains panel board data for each test, detailed particulate, O2, CO2, NO, SO2, and SO3 data, particle size distribution data, chemical analysis of the coal, coal size consistency data, and combustible analysis and overfire air traverse data.

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Stokers	Sulfur Oxides			

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by

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Project Officers: R. Hall (EPA) and W. Harvey, Jr. (DoE)

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Washington, DC 20545

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Foreword

The purpose of this Data Supplement Volume is to document data in greater detail than was practical in the Final Technical Report.[1] It is intended to provide the necessary details to other researchers who are interested in performing their own analysis. Readers are referred to the contract final report for information as to objectives, description of facility tested and coals fired, test equipment and procedures, interpretations and conclusions. The final Technical Report also contains data summaries not found in this volume.

The data in this volume are arranged by type (i.e., Panel Board Data, Particulate Data, etc.) and within each type by test number. Data summaries where they exist are at the front of each section. The boiler tested is referred to as Boiler J; as it is the tenth boiler tested under the program entitled, "A Testing Program to Update Equipment Specifications and Design Criteria for Stoker Fired Boilers".

KVB 4-15900-545

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[1] Langsjoen, P. L.,et al., "Field Tests of Industrial Stoker Coal-Fired Boilers for Emissions Control and Efficiency Improvemenet - Site J.

CONVERSION FACTORS

ENGLISH AND METRIC UNITS TO SI UNITS

To Convert From	To	Multiply By
in	cm	2.540
in^2	cm^2	6.452
ft	m	0.3048
ft^2	m^2	0.09290
ft^3	m^3	0.02832
lb	Kg	0.4536
lb/hr	Mg/s	0.1260
$lb/10^6BTU$	ng/J	430
g/Mcal	ng/J	239
BTU	J	1054
BTU/lb	J/kg	2324
BTU/hr	W	0.2929
J/sec	W	1.000
J/hr	W	3600
BTU/ft/hr	W/m	0.9609
BTU/ft/hr	J/hr/m	3459
$BTU/ft^2/hr$	W/m^2	3.152
$BTU/ft^2/hr$	$J/hr/m^2$	11349
$BTU/ft^3/hr$	W/m^3	10.34
$BTU/ft^3/hr$	$J/hr/m^3$	37234
psia	Pa	6895
$"H_2O$	Pa	249.1
Rankine	Celsius	C = 5/9R-273
Fahrenheit	Celsius	C = 5/9(F-32)
Celsius	Kelvin	K = C+273
Rankine	Kelvin	K = 5/9R

FOR TYPICAL COAL FUEL

ppm @ 3% O_2 (SO_2)	ng/J ($lb/10^6Btu$)	0.851 ($1.98x10^{-3}$)
ppm @ 3% O_2 (SO_3)	ng/J ($lb/10^6Btu$)	1.063 ($2.47x10^{-3}$)
ppm @ 3% O_2 (NO)*	ng/J ($lb/10^6Btu$)	0.399 ($9.28x10^{-4}$)
ppm @ 3% O_2 (NO_2)	ng/J ($lb/10^6Btu$)	0.611 ($1.42x10^{-3}$)
ppm @ 3% O_2 (CO)	ng/J ($lb/10^6Btu$)	0.372 ($8.65x10^{-4}$)
ppm @ 3% O_2 (CH_4)	ng/J ($lb/10^6Btu$)	0.213 ($4.95x10^{-4}$)
g/kg of fuel**		

*Federal environmental regulations express NOx in terms of NO_2; thus NO units should be converted using the NO_2 conversion factor.

**Based on higher heating value of 10,000 Btu/lb. For a heating value other than 10,000 Btu/lb, multiply the conversion factor by 10,000/(Btu/lb).

CONVERSION FACTORS

SI UNITS TO ENGLISH AND METRIC UNITS

To Convert From	To	Multiply By
cm	in	0.3937
cm^2	in^2	0.1550
m	ft	3.281
m^2	ft^2	10.764
m^3	ft^3	35.315
Kg	lb	2.205
Mg/s	lb/hr	7.937
ng/J	$lb/10^6BTU$	0.00233
ng/J	g/Mcal	0.00418
J	BTU	0.000948
J/kg	BTU/lb	0.000430
J/hr/m	BTU/ft/hr	0.000289
$J/hr/m^2$	$BTU/ft^2/hr$	0.0000881
$J/hr/m^3$	$BTU/ft^3/hr$	0.0000269
W	BTU/hr	3.414
W	J/hr	0.000278
W/m	BTU/ft/hr	1.041
W/m^2	$BTU/ft^2/hr$	0.317
W/m^3	$BTU/ft^3/hr$	0.0967
Pa	psia	0.000145
Pa	"H_2O	0.004014
Kelvin	Fahrenheit	F = 1.8K-460
Celsius	Fahrenheit	F = 1.8C+32
Fahrenheit	Rankine	R = F+460
Kelvin	Rankine	R = 1.8K

FOR TYPICAL COAL FUEL

ng/J	ppm @ 3% O_2 (SO_2)	1.18
ng/J	ppm @ 3% O_2 (SO_3)	0.941
ng/J	ppm @ 3% O_2 (NO)	2.51
ng/J	ppm @ 3% O_2 (NO_2)	1.64
ng/J	ppm @ 3% O_2 (CO)	2.69
ng/J	ppm @ 3% O_2 (CH_4)	4.69
ng/J	g/kg of fuel	0.000233

SI PREFIXES

Multiplication Factor	Prefix	SI Symbol
10^{18}	exa	E
10^{15}	peta	P
10^{12}	tera	T
10^{9}	giga	G
10^{6}	mega	M
10^{3}	kilo	k
10^{2}	hecto*	h
10^{1}	deka*	da
10^{-1}	deci*	d
10^{-2}	centi*	c
10^{-3}	milli	m
10^{-6}	micro	μ
10^{-9}	nano	n
10^{-12}	pico	p
10^{-15}	femto	f
10^{-18}	atto	a

*Not recommended but occasionally used

EMISSION UNITS CONVERSION FACTORS
FOR TYPICAL COAL FUEL (HV = 13,320 BTU/LB)

To Obtain \ Multiply By		% Weight in Fuel		$lbs/10^6Btu$		$grams/10^6Cal$		PPM (Dry @ 3% O_2)		Grains/SCF. (Dry @ 12% CO_2)	
		S	N	SO_2	NO_2	SO_2	NO_2	SOx	NOx	SO_2	NO_2
% Weight In Fuel	S	1		0.666	▨	0.370	▨	$13.2x10^{-4}$	▨	1.48	▨
	N			▨	0.405	▨	0.225	▨	$5.76x10^{-4}$	▨	.903
$lbs/10^6Btu$	SO_2	1.50	▨	1		(.556)	▨	$19.8x10^{-4}$	▨	(2.23)	▨
	NO_2	▨	2.47			▨	(.556)	▨	$14.2x10^{-4}$	▨	(2.23)
$grams/10^6Cal$	SO_2	2.70	▨	(1.8)	▨	1		$35.6x10^{-4}$	▨	(4.01)	▨
	NO_2	▨	4.44	▨	(1.8)			▨	$25.6x10^{-4}$	▨	(4.01)
PPM (Dry @ 3% O_2)	SOx	758	▨	505	▨	281	▨	1		1127	▨
	NOx	▨	1736	▨	704	▨	391			▨	1566
Grains/SCF (Dry @ 12% CO_2)	SO_2	.676	▨	(.448)	▨	(.249)	▨	$8.87x10^{-4}$	▨	1	
	NO_2	▨	1.11	▨	(.448)	▨	(.249)	▨	$6.39x10^{-4}$		

NOTE: 1. Values in parenthesis can be used for all flue gas constituents such as oxides of carbon, oxides of nitrogen, oxides of sulfur, hydrocarbons, particulates, etc.
2. Standard reference temperature of 530°R was used.

SECTION 1.0

PANEL BOARD DATA

PAGE

1.1 CONTROL ROOM DATA 2

Steam Flow, lbs/hr 33,766
Coal Flow, lbs/hr 3000
% Design Capacity 48.2
lb steam/lb coal 11.3

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PANEL BOARD DATA

ABMA TEST SITE J

TEST NO.	01				
TEST DATE	6-3-79				
TEST COAL	Ohio				
TEST CONDITIONS	35,000 LB/HR				
COAL					
TIME	13:30			15:30	
POUNDS ADDED	filled			3 tons	
STEAM TIME	13:25	14:23	15:25	15:50	
INTEGRATOR READING	50876	50917	50962	50978	
CHART RECORDER					
STEAM FLOW Klbs/hr	36	36	32	35	
AIR FLOW, RELATIVE	33	35	32		
DRAFT GAUGES					
WIND BOX "H_2O	1.4	2.0	1.4		
FURNACE "H_2O	0.2	0.2	0.2		
BOILER OUT "H_2O	-0.8	-0.5	-0.6		
DUST COLLECTOR "H_2O	-3.0	-3.5	-3.0		
STOKER ZONE #1	0	0	0		
#2	0.2	0.2	0.2		
#3	0	0	0		
#4	0	0	0		
#5	0	0	0		
#6	0	0	0		

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Test #01

PRESSURE GAUGES					
STEAM PRESSURE psig	128	127	160		
FEEDWATER psig	162	180	185		
AIR PRESSURE psig					
CONTROLS					
BOILER MASTER	100				
STOKER	100				
FORCED DRAFT	10				
OVERFIRE AIR	4½				
INDUCED DRAFT	-0.2				
STOKER					
COAL GATE POSITION	5				
WIND BOX POSITION #1	0				
#2	0				
#3	0				
#4	0				
#5	0				
#6	0				
OVERFIRE AIR PRESSURE "H_2O	0.75				
TEMP. F.D. FAN °F					
TEMP. F.W. °F					

Steam Flow, lbs/hr 51,652
Coal Flow, lbs/hr 4219
% Design Capacity 73.8
lb steam/lb coal 12.2

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PANEL BOARD DATA

ABMA TEST SITE J

TEST NO.	2				
TEST DATE	6-4-79				
TEST COAL	Ohio				
TEST CONDITIONS	50,000 LB/HR	as found			
COAL					
TIME	1:45			4:50	
POUNDS ADDED	filled			13010 pounds	
STEAM TIME	1:47	2:46	3:49	4:51	
INTEGRATOR READING	51732	51794	51863	51930	
CHART RECORDER					
STEAM FLOW Klbs/hr	50	50	52		
AIR FLOW, RELATIVE	52	54	54		
DRAFT GAUGES					
WIND BOX "H_2O	1.4	1.3	1.3		
FURNACE "H_2O	0.25	0.25	0.25		
BOILER OUT "H_2O	-0.8	-0.5	-0.5		
DUST COLLECTOR "H_2O	-3.2	-3.5	-3.5		
STOKER ZONE #1	0.4	0.6	0.5		
#2	0.8	1.0	0.9		
#3	0.5	0.6	0.5		
#4	0	0	0		
#5	0	0	0		
#6	0	0	0		

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TEST #02

PRESSURE GAUGES					
STEAM PRESSURE psig	138	114	150		
FEEDWATER psig	164	170	169		
AIR PRESSURE psig					
CONTROLS					
BOILER MASTER	100	100	47		
STOKER	88	100	25		
FORCED DRAFT	70	70	65		
OVERFIRE AIR	67	68	65		
INDUCED DRAFT	-0.2	-0.2	-0.2		
STOKER					
COAL GATE POSITION	7.2	7.7	7.5		
WIND BOX POSITION #1	0	0	0		
#2	0	0	0		
#3	0	0	0		
#4	0	0	0		
#5	0	0	0		
#6	0	0	0		
OVERFIRE AIR PRESSURE "H_2O	3.5				
TEMP. F.D. FAN °F					
TEMP. F.W. °F					

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Steam Flow, lbs/hr______
Coal Flow, lbs/hr______
% Design Capacity______
lb steam/lb coal______

PANEL BOARD DATA
ABMA TEST SITE J

TEST NO.	03				
TEST DATE	6-5-79				
TEST COAL	Ohio				
TEST CONDITIONS	70,000 LB/HR	low O_2			
COAL					
TIME	10:00				
POUNDS ADDED	filled	BOILER	STARTED	SMOKING	
STEAM TIME	1000	REALLY	BAD, SO	TESTING	
INTEGRATOR READING	52500	WAS	STOPPED		
CHART RECORDER					
STEAM FLOW Klbs/hr	70				
AIR FLOW, RELATIVE	58				
DRAFT GAUGES					
WIND BOX "H_2O					
FURNACE "H_2O	0.25				
BOILER OUT "H_2O					
DUST COLLECTOR "H_2O					
STOKER ZONE #1	0.5				
#2	1.2				
#3	1.0				
#4	0.2				
#5	0				
#6	0				

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	TEST #03				
PRESSURE GAUGES					
STEAM PRESSURE psig	130				
FEEDWATER psig	195				
AIR PRESSURE psig					
CONTROLS					
BOILER MASTER	100				
STOKER	44				
FORCED DRAFT	85				
OVERFIRE AIR	60				
INDUCED DRAFT	-0.2				
STOKER					
COAL GATE POSITION	8.4				
WIND BOX POSITION #1	0				
#2	0				
#3	0				
#4	0				
#5	0				
#6	0				
OVERFIRE AIR PRESSURE "H_2O					
TEMP. F.D. FAN °F					
TEMP. F.W. °F					

Steam Flow, lbs/hr 71,822
Coal Flow, lbs/hr 6000
% Design Capacity 102.6
lb steam/lb coal 12.0

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PANEL BOARD DATA
ABMA TEST SITE J

TEST NO.	5				
TEST DATE	6-12-79				
TEST COAL	OHIO				
TEST CONDITIONS	70,000				
COAL					
TIME	3:15			5:45	
POUNDS ADDED	full			7½ tons	
STEAM Time	3:22	4:18	5:22	5:37	
INTEGRATOR READING x800	58,775	58,959	58,954	58,977	
CHART RECORDER					
STEAM FLOW Klbs/hr	73	70	74		
AIR FLOW, RELATIVE	59	57	58		
DRAFT GAUGES					
WIND BOX "H_2O	2.0	2.2	2.3		
FURNACE "H_2O	-0.2	-0.2	-0.2		
BOILER OUT "H_2O	-0.8	-0.7	-0.7		
DUST COLLECTOR "H_2O	-7.0	-7.2	-7.0		
STOKER ZONE #1	0.6	0.7	0.7		
#2	1.4	1.5	1.5		
#3	1.1	0.9	1.1		
#4	0.1	0.	0.1		
#5	0	0	0		
#6	0	0	0		

PRESSURE GAUGES					
STEAM PRESSURE psig	130	125	132		
FEEDWATER psig	170	190	190		
AIR PRESSURE psig	50	50	50		
CONTROLS					
BOILER MASTER	100	100	100		
STOKER	100	100	100		
FORCED DRAFT	100	100	100		
OVERFIRE AIR	70	70	70		
INDUCED DRAFT	0.2	-0.2	-0.2		
STOKER					
COAL GATE POSITION	11.0	10.7	10.7		
WIND BOX POSITION #1	0	0	0		
#2	0	0	0		
#3	0	0	0		
#4	0	0	0		
#5	0	0	0		
#6	0	0	0		
OVERFIRE AIR PRESSURE "H_2O	7 3/4"				
TEMP. F.D. FAN °F	70				
TEMP. F.W. °F	215				

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Steam Flow, lbs/hr 69,01[illegible]
Coal Flow, lbs/hr 4991
% Design Capacity [illegible]
lb steam/lb coal 14

PANEL BOARD DATA

ABMA TEST SITE J

TEST NO.	6				
TEST DATE	6-13-79				
TEST COAL	Kentucky				
TEST CONDITIONS	70,000				
COAL					
TIME	11:15			2:05	
POUNDS ADDED	filled			7 ton	
STEAM Time	11:05	12:08	1:07	2:10	
INTEGRATOR READING	59,674	59,766	59,850	59,940	
CHART RECORDER					
STEAM FLOW Klbs/hr	70	72	70		
AIR FLOW, RELATIVE	56	58	57		
DRAFT GAUGES					
WIND BOX "H_2O	2.4	2.2	2.4		
FURNACE "H_2O	0.25	0.25	0.20		
BOILER OUT "H_2O	-0.7	-0.8	-0.8		
DUST COLLECTOR "H_2O	-6.5	-7.0	-6.7		
STOKER ZONE #1	0.5	0.4	0.5		
#2	1.1	1.0	1.0		
#3	0.7	0.5	0.5		
#4	0	0	0		
#5	0	0	0		
#6	0	0	0		

PRESSURE GAUGES					
STEAM PRESSURE psig	140	140	142		
FEEDWATER psig	195	225	173		
AIR PRESSURE psig	50	50	50		
CONTROLS					
BOILER MASTER	50	100	50		
STOKER	50	100	50		
FORCED DRAFT	35	50	50		
OVERFIRE AIR	55	60	60		
INDUCED DRAFT	0.1	0.2	0.2		
STOKER					
COAL GATE POSITION					
WIND BOX POSITION #1	9.0	6.5	8.2		
#2	0	0	0		
#3	0	0	0		
#4	0	0	0		
#5	0	0	0		
#6	0	0			
OVERFIRE AIR PRESSURE "H_2O	4"		4"		
TEMP. F.D. FAN °F		70	70		
TEMP. F.W. °F		217	220		

Steam Flow, lbs/hr 59,463
Coal Flow, lbs/hr 4800
% Design Capacity 84.9
lb steam/lb coal 12.4

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PANEL BOARD DATA
ABMA TEST SITE J

TEST NO.	7				
TEST DATE	6-14-79				
TEST COAL	OHIO				
TEST CONDITIONS	60,000				
COAL					
TIME	11:00		13:15		
POUNDS ADDED	filled		10,800		
STEAM Time	11:00	12:15	13:14		
INTEGRATOR READING	60635	60725	60801		
CHART RECORDER					
STEAM FLOW Klbs/hr	61	60			
AIR FLOW, RELATIVE	47	50			
DRAFT GAUGES					
WIND BOX "H_2O	2.0	2.2			
FURNACE "H_2O	-0.20	-0.20			
BOILER OUT "H_2O	-0.5	-0.6			
DUST COLLECTOR "H_2O	-4.5	-5.0			
STOKER ZONE #1	0.3	0.3			
#2	0.7	0.7			
#3	0.4	0.5			
#4	0	0			
#5	0	0			
#6	0	0			

PRESSURE GAUGES					
STEAM PRESSURE psig	147	140			
FEEDWATER psig	196	202			
AIR PRESSURE psig	50	50			
CONTROLS					
BOILER MASTER	25	60			
STOKER	25	60			
FORCED DRAFT	55	60			
OVERFIRE AIR	60	60			
INDUCED DRAFT	-0.2	-0.2			
STOKER					
COAL GATE POSITION	8.4	8.5			
WIND BOX POSITION #1	0	0			
#2	0	0			
#3	0	0			
#4	0	0			
#5	0	0			
#6	0	0			
OVERFIRE AIR PRESSURE "H_2O	4.25	4.25			
TEMP. F.D. FAN °F	80	81			
TEMP. F.W. °F	224	224			

Steam Flow, lbs/hr 51,200
Coal Flow, lbs/hr 4138
% Design Capacity 73.1
lb steam/lb coal 12.4

KVB

PANEL BOARD DATA

ABMA TEST SITE J

TEST NO.	8				
TEST DATE	6-15-79				
TEST COAL	Kentucky				
TEST CONDITIONS	50,000				
COAL					
TIME	10:25			12:50	
POUNDS ADDED	filled			10,000	
STEAM Time	10:22	11:26	12:27	12:52	
INTEGRATOR READING	61550	61620	61684	61710	
CHART RECORDER					
STEAM FLOW Klbs/hr	53	52	52		
AIR FLOW, RELATIVE	40	41	42		
DRAFT GAUGES					
WIND BOX "H_2O	1.4	1.3	1.3		
FURNACE "H_2O	-0.2	-0.20	0.25		
BOILER OUT "H_2O	-0.8	-0.5	-0.5		
DUST COLLECTOR "H_2O	-3.2	-3.5	-3.5		
STOKER ZONE #1	0.2	0.2	0.2		
#2	0.7	0.7	0.6		
#3	0	0.1	0.1		
#4	0	0	0		
#5	0	0	0		
#6	0	0	0		

KVB

PRESSURE GAUGES					
STEAM PRESSURE psig	125	145	140		
FEEDWATER psig	200	165	190		
AIR PRESSURE psig	50	50	50		
CONTROLS					
BOILER MASTER	100	40	60		
STOKER	100	40	60		
FORCED DRAFT	45	40	45		
OVERFIRE AIR	45	45	47		
INDUCED DRAFT	-0.2	0.2	-0.2		
STOKER					
COAL GATE POSITION	6.8	6.7	6.9		
WIND BOX POSITION #1	0	0	0		
#2	0	0	0		
#3	0	0	0		
#4	0	0	0		
#5	0	0	0		
#6	0	0	0		
OVERFIRE AIR PRESSURE "H_2O		2.5			
TEMP. F.D. FAN °F		83			
TEMP. F.W. °F		224			

Steam Flow, lbs/hr 34,699
Coal Flow, lbs/hr 47.6
% Design Capacity 49.6
lb steam/lb coal 12.2

KVB

PANEL BOARD DATA
ABMA TEST SITE J

TEST NO.	9				
TEST DATE	6-16-79				
TEST COAL	Kentucky				
TEST CONDITIONS	35,000				
COAL					
TIME	1030			13:10	
POUNDS ADDED	filled			7600	
STEAM Time	10:25	11:36	12:25	13:11	
INTEGRATOR READING x 800	62376	62426	62462	62496	
CHART RECORDER					
STEAM FLOW Klbs/hr	35,000	38	35		
AIR FLOW, RELATIVE	36	38	38		
DRAFT GAUGES					
WIND BOX "H_2O	1.4	2.0	1.6		
FURNACE "H_2O	-0.15	-0.15	-0.15		
BOILER OUT "H_2O	-0.5	-0.5	-0.4		
DUST COLLECTOR "H_2O	-2.7	-3.5	-3.2		
STOKER ZONE #1	0.3	0.4	0.3		
#2	0.7	0.9	0.8		
#3	0	0.1	0.1		
#4	0	0	0		
#5	0	0	0		
#6	0	0	0		

PRESSURE GAUGES					
STEAM PRESSURE psig	142	140	140		
FEEDWATER psig	180	185	181		
AIR PRESSURE psig	50	50	50		
CONTROLS					
BOILER MASTER	40	50	50		
STOKER	40	50	50		
FORCED DRAFT	20	20	18		
OVERFIRE AIR	37	42	42		
INDUCED DRAFT	-0.1	-0.1	-0.1		
STOKER					
COAL GATE POSITION	5.7	5.8	5.7		
WIND BOX POSITION #1	0	0	0		
#2	0	0	0		
#3	0	0	0		
#4	0	0	0		
#5	0	0	0		
#6	0	0	0		
OVERFIRE AIR PRESSURE "H_2O	2.25				
TEMP. F.D. FAN °F	82				
TEMP. F.W. °F		224			

Steam Flow, lbs/hr 71,719
Coal Flow, lbs/hr 5419
% Design Capacity 102.5
lb steam/lb coal 13.2

KVB

PANEL BOARD DATA

ABMA TEST SITE J

TEST NO.	13				
TEST DATE	6-19-79				
TEST COAL	OHIO				
TEST CONDITIONS	70,000 lb/hr				
COAL					
TIME	10:55	13:30			
POUNDS ADDED	filled	7 ton			
STEAM Time	12:53	13:57			
INTEGRATOR READING x800	64823	64913			
CHART RECORDER					
STEAM FLOW Klbs/hr	68	68			
AIR FLOW, RELATIVE	56	58			
DRAFT GAUGES					
WIND BOX "H_2O	2.0	2.0			
FURNACE "H_2O	-0.2	-0.2			
BOILER OUT "H_2O	-0.6	-0.7			
DUST COLLECTOR "H_2O	-5.2	-6.0			
STOKER ZONE #1	0.7	0.5			
#2	1.5	1.0			
#3	0.8	0.7			
#4	0	0			
#5	0	0			
#6	0	0			

KVB

PRESSURE GAUGES					
STEAM PRESSURE psig	140	135			
FEEDWATER psig	145	142			
AIR PRESSURE psig	50	50			
CONTROLS					
BOILER MASTER	48	60			
STOKER	50	65			
FORCED DRAFT	75	75			
OVERFIRE AIR	30	30			
INDUCED DRAFT	0.1	0.1			
STOKER					
COAL GATE POSITION	9.5	9.0			
WIND BOX POSITION #1	0	0			
#2	0	0			
#3	0	0			
#4	0	0			
#5	0	0			
#6	0	0			
OVERFIRE AIR PRESSURE "H_2O	1				
TEMP. F.D. FAN °F	75				
TEMP. F.W. °F	224				

Steam Flow, lbs/hr 68,000
Coal Flow, lbs/hr 5876
% Design Capacity 97.1
lb steam/lb coal 11.6

KVB

PANEL BOARD DATA

ABMA TEST SITE J

TEST NO.	14				
TEST DATE					
TEST COAL	OHIO				
TEST CONDITIONS	70,000 compliance				
COAL					
TIME	11:45				
POUNDS ADDED	filled				
STEAM Time	11:47	12:15	12:47	13:15	13:47
INTEGRATOR READING	65813		65898		65984
CHART RECORDER					
STEAM FLOW Klbs/hr	70,000		63,000	68,000	70,000
AIR FLOW, RELATIVE	57		55	59	57
DRAFT GAUGES					
WIND BOX "H_2O	1.8	1.7	1.9	1.8	2.0
FURNACE "H_2O	-0.2	-0.2	-0.25	-0.	-0.25
BOILER OUT "H_2O	-0.7	-0.7	-0.7	-0.7	-0.7
DUST COLLECTOR "H_2O	-6.8	-7.0	-6.5	-6.5	-6.5
STOKER ZONE #1	0.4	0.4	0.6	0.7	1.0
#2	1.1	1.1	1.5	1.3	1.7
#3	0.8	0.7	0.7	1.0	1.4
#4	0	0	0	0.2	0.3
#5	0	0	0	0	0
#6	0	0	0	0	0

KVB

PANEL BOARD DATA

ABMA TEST SITE J

Steam Flow, lbs/hr 68,000
Coal Flow, lbs/hr 5876
% Design Capacity 97.1
lb steam/lb coal 11.6

TEST NO.	14				
TEST DATE					
TEST COAL	OH 10				
TEST CONDITIONS	70,000				
COAL					
TIME					16:55
POUNDS ADDED					30,360 added
STEAM Time	14:19	14:47	15:15	15:47	16:47
INTEGRATOR READING X800		66068		66153	66238
CHART RECORDER					
STEAM FLOW Klbs/hr	68,000	68000	70,000	67000	
AIR FLOW, RELATIVE	58	59	59	56	
DRAFT GAUGES					
WIND BOX "H_2O	2.0	2.0	1.7	2.0	
FURNACE "H_2O	-.25	-.25	-0.2	-0.2	
BOILER OUT "H_2O	-0.7	-0.7	-0.70	-0.7	
DUST COLLECTOR "H_2O	-6.5	-6.5	-7.0	-6.5	
STOKER ZONE #1	0.7	0.7	0.3	0.5	
#2	1.5	1.5	1.0	1.2	
#3	1.2	1.2	08	0.8	
#4	0.3	0.3	0.1	0	
#5	0	0	0	0	
#6	0	0	0	0	

PRESSURE GAUGES					
STEAM PRESSURE psig	140	145	130	138	138
FEEDWATER psig	187	187	197	144	187
AIR PRESSURE psig	50	50	50	50	50
CONTROLS					
BOILER MASTER	71	22	100	100	90
STOKER	71	25	100	100	90
FORCED DRAFT	50	55	55	56	60
OVERFIRE AIR	100	60	100	100	70
INDUCED DRAFT	-0.2	-0.2	-0.2	-0.2	-0.2
STOKER					
COAL GATE POSITION	10.1	10.5	10.5	10.5	10.1
WIND BOX POSITION #1	0	0	0	0	0
#2	0	0	0	0	0
#3	0	0	0	0	0
#4	0	0	0	0	0
#5	0	0	0	0	0
#6	0	0	0	0	0
OVERFIRE AIR PRESSURE "H_2O		7 3/4"			
TEMP. F.D. FAN °F		80			
TEMP. F.W. °F		224			

PRESSURE GAUGES					
STEAM PRESSURE psig	140	140	150	135	150
FEEDWATER psig	145	189	180	180	187
AIR PRESSURE psig	50	50	50	50	50
CONTROLS					
BOILER MASTER	100	75		82	20
STOKER	100	75		80	45
FORCED DRAFT	55	55		45	60
OVERFIRE AIR	100	100		100	85
INDUCED DRAFT	-0.2	-0.2		-0.2	-0.2
STOKER					
COAL GATE POSITION	10.1	10.1	10.1	10.1	10.1
WIND BOX POSITION #1	0	0	0	0	0
#2	0	0	0	0	0
#3	0	0	0	0	0
#4	0	0	0	0	0
#5	0	0	0	0	0
#6	0	0	0	0	0
OVERFIRE AIR PRESSURE "H_2O	7 3/4				7 1/2
TEMP. F.D. FAN °F					80
TEMP. F.W. °F	225				230

KVB

NOTES

TEST NO: 14

Coal used

Bunker leveled at 11:45

pounds added	250	1980	1470	2010
	2030	2020	2100	1960
	1470	2010	2030	1470
	2000	1980	2000	2080

total 30,360 lbs

TEST NO:

Bunker leveled off at 16:55

TEST NO:

TEST NO:

TEST NO:

KVB

Steam Flow, lbs/hr 65,760
Coal Flow, lbs/hr 5143
% Design Capacity 93.9
lb steam/lb coal 12.8

PANEL BOARD DATA
ABMA TEST SITE J

TEST NO.	15				
TEST DATE	6-28-79				
TEST COAL	Kentucky				
TEST CONDITIONS	as found				
Sass - SOx					
COAL					
TIME	12:00	1300	14:09	15:00	16:00
POUNDS ADDED	filled				
STEAM					
INTEGRATOR READING	71512	71592	71688	71759	71842
CHART RECORDER					
STEAM FLOW Klbs/hr	66	65	63	68	70
AIR FLOW, RELATIVE	54	54	55	55	56
DRAFT GAUGES					
WIND BOX "H_2O	2.4	2.4	2.2	2.4	1.6
FURNACE "H_2O	-0.20	-0.20	-0.25	-0.23	-0.20
BOILER OUT "H_2O	-0.7	-0.7	-0.8	-0.8	-0.6
DUST COLLECTOR "H_2O	-5.5	-5.5	-6.5	-6.7	-5.5
STOKER ZONE #1	0.6	0.6	0.6	+0.7	0.5
"H_2O #2	1.1	1.1	1.2	1.4	0.9
#3	0.5	0.5	0.6	0.7	0.5
#4	0	0	0	0	0
#5	0	0	0	0	0
#6	0	0	0	0	0

Steam Flow, lbs/hr 65,760
Coal Flow, lbs/hr 5143
% Design Capacity 43.9
lb steam/lb coal 12.8

KVB

PANEL BOARD DATA

ABMA TEST SITE J

TEST NO.	15				
TEST DATE	6-28-79				
TEST COAL	Kentucky				
TEST CONDITIONS	as found				
Sass -Sox					
COAL					
TIME	17:00				
POUNDS ADDED	13.5 tons				
STEAM					
INTEGRATOR READING	71923				
CHART RECORDER					
STEAM FLOW Klbs/hr	66				
AIR FLOW, RELATIVE	54				
DRAFT GAUGES					
WIND BOX "H_2O	1.6				
FURNACE "H_2O	-0.22				
BOILER OUT "H_2O	-0.6				
DUST COLLECTOR "H_2O	-5.4				
STOKER ZONE #1	0.5				
#2	1.0				
#3	0.5				
#4	0				
#5	0				
#6	0				

PRESSURE GAUGES					
STEAM PRESSURE psig	145	125	135	144	145
FEEDWATER psig	180	150	160	170	170
AIR PRESSURE psig	50	50	50	50	50
CONTROLS					
BOILER MASTER	25	100	100	27	25
STOKER	25	60	100	27	40
FORCED DRAFT	50	75	100	45	62
OVERFIRE AIR	60	65	80	90	70
INDUCED DRAFT	0.2	-0.2	-0.2	-0.2	-0.2
STOKER					
COAL GATE POSITION	8.2	9.0	9.3	9.5	9.2
WIND BOX POSITION #1	0	0	0	0	0
#2	0	0	0	0	0
#3	0	0	0	0	0
#4	0	0	0	0	0
#5	0	0	0	0	0
#6	0	0	0	0	0
OVERFIRE AIR PRESSURE "H_2O		6.5		6.5	4.25 →
TEMP. F.D. FAN °F		80	82		
TEMP. F.W. °F		216		216	

PRESSURE GAUGES					
STEAM PRESSURE psig	145				
FEEDWATER psig	210				
AIR PRESSURE psig	50				
CONTROLS					
BOILER MASTER	25				
STOKER	30				
FORCED DRAFT	62				
OVERFIRE AIR	50				
INDUCED DRAFT	-0.2				
STOKER					
COAL GATE POSITION	9.5				
WIND BOX POSITION #1	0				
#2	0				
#3	0				
#4	0				
#5	0				
#6	0				
OVERFIRE AIR PRESSURE "H_2O					
TEMP. F.D. FAN °F					
TEMP. F.W. °F					

Steam Flow, lbs/hr 64,808
Coal Flow, lbs/hr 5200
% Design Capacity 92.6
lb steam/lb coal 12.5

KVB

PANEL BOARD DATA

ABMA TEST SITE J

TEST NO.	16				
TEST DATE	6-30-79				
TEST COAL	2H10				
TEST CONDITIONS	as found				
Sassd SOx					
COAL					
TIME	11:15				1615
POUNDS ADDED	filled				13 tons
STEAM					
INTEGRATOR READING	11:15	12:30	13:30	14:30	16:12
CHART RECORDER					73632
STEAM FLOW Klbs/hr	70	60	65	62	65
AIR FLOW, RELATIVE	56	55	52	55	58
DRAFT GAUGES					
WIND BOX "H_2O	1.8	2.1	2.4	2.2	2.1
FURNACE "H_2O	-0.20	-0.20	-0.21	-0.20	-0.25
BOILER OUT "H_2O	-0.7	-0.7	-0.7	-0.7	-0.8
DUST COLLECTOR "H_2O	-6.4	-6.5	-6.3	-6.6	-7.0
STOKER ZONE #1	0.2	0.2	0.3	0.5	0.7
#2	0.7	0.8	1.0	1.0	1.5
#3	0.3	0.2	0.2	0.2	1.0
#4	0	0	0	0	0
#5	0	0	0	0	0
#6	0	0	0	0	0

PRESSURE GAUGES					
STEAM PRESSURE psig	137	130	130	120	125
FEEDWATER psig	162	135	147	150	178
AIR PRESSURE psig	50	50	50	50	50
CONTROLS					
BOILER MASTER	36	60	55	100	45
STOKER	59	90	85	65	35
FORCED DRAFT	90	90	85	85	70
OVERFIRE AIR	65	50	75	70	100
INDUCED DRAFT	-0.2	-0.2	-0.2	-0.2	-0.2
STOKER					
COAL GATE POSITION	8.5	8.5	8.3	9.0	9.4
WIND BOX POSITION #1	0	0	0	0	0
#2	0	0	0	0	0
#3	0	0	0	0	0
#4	0	0	0	0	0
#5	0	0	0	0	0
#6	0	0	0	0	0
OVERFIRE AIR PRESSURE "H_2O	6		6		8 ½
TEMP. F.D. FAN °F	75		75		73
TEMP. F.W. °F	216		216		217

SECTION 2.0

PARTICULATE DATA

PAGE

2.1 PARTICULATE DATA SUMMARY 32

2.2 PARTICULATE DATA 34

2.3 PARTICULATE LAB WORKSHEETS 50

BLR OUT AREA = 30.65 ft²
STACK AREA = 18.35 ft²

PARTICULATE DATA SUMMARY
PART I

LOCATION: ABMA TEST SITE J

TEST NO.	Total Mass mgm.	Dry Gas Volume ft³	Liquid Coll. ml.	Baro. Press. "Hg	Static Press. "H_2O	Pitot ΔP "H_2O	Orifice ΔH "H_2O	Stack Gas Temp. °R	Excess O_2 %	Sampling Time min.	Nozzle Dia. in.	Pitot Factor n.d.	Fuel Factor SCF/10^6BTU	Flue Gas MW g/g mole
BLR 01	428.1	48.57	59	29.52	-0.18	0.205	1.29	934	10.2	60.17	0.378	0.837	9634	2885
STACK 01	125.3	43.582	50.5	29.52	-0.12	0.092	0.63	779	9.7	72.42	0.375	0.817	9634	2895
BLR 02	970.4	55,354	59.8	29.42	-0.625	0.493	1.55	970	10.6	60.5	0.316	0.837	9773	29.15
STACK 02	432.1	10· 897	127	29.36	-0.02	0.20	1.34	820	10.8	120	0.377	0.817	9773	29.05
BLR 05	1313.6	34.074	59	29.55	-2.0	0.65	0.61	1008	7.9	60	0.235	0.837	10453	29.04
STACK 05	284.7	47.897	74	29.70	-0.26	0.243	0.75	827	8.3	72	0.312	0.817	10453	29.11
BLR 06	1811.5	88.781	100	29.88	-1.25	0.59	1.62	1010	8.1	98.23	0.316	0.837	9553	29.34
STACK 06	303.9	60.202	80	29.88	-0.26	0.22	0.67	816	8.7	96	0.312	0.817	9553	29.20
BLR 07	635.9	50.867	78	29.85	-1.25	0.46	1.31	969	8.7	60	0.316	0.837	9804	29.09
STACK 07	178.3	41.189	63	29.85	-0.21	0.185	0.56	800	9.2	72	0.312	0.817	9804	29.06
BLR 08	632.5	40.699	69	29.80	-0.625	0.297	0.837	943	9.0	60	0.316	0.837	9537	2885
STACK 08	143.9	47.375	72	29.80	-0.06	0.105	0.769	777	9.2	72	0.377	0.817	9537	29.11
BLR 09	440.2	40.627	52	29.69	-0.78	0.26	0.83	920	12.2	60	0.316	0.837	10721	28.95
STACK 09	150.6	42.958	59	29.69	-0.12	0.081	0.62	763	11.5	72	0.377	0.817	10721	28.95
BLR 13														
STACK 13	BLNK													
BLR 14	2726.7	105.410	149	29.67	-2.0	0.58	3.7	998	8.8	80.23	0.377	0.837	10013	29.19
STACK 14	428.4	74.664	130	29.67	-0.28	0.216	0.68	821	9.0	120	0.313	0.817	10013	28.97

#15900 rev.

PARTICULATE DATA SUMMARY
PART II

Location ASMA TEST SITE J - corrected

TEST NO.	LOAD %	O_2 %	CONDITIONS	EMISSIONS			Moisture %	Stack Gas Velocity Ft/sec	Stack Gas Flow SCF/sec	Isokin. %
				lb/10^6BTU	GR/SCF	LB/HR				
BLR OUT 01	48.2	10.2	OHIO COAL AS FOUND	0.369	0.137	41	5.50	3396	582	95
STACK 01	48.2	9.7		0.115	0.045	6	5.27	20.23	249	101
BLR OUT 02	73.8	10.6		0.779	0.276	125	4.93	53.47	879	101
STACK 02	73.8	10.8	↓	0.188	0.065	12	5.56	30.62	356	100
BLR OUT 05	102.6	7.9	low O_2	1.442	0.602	307	7.66	62.67	993	104
STACK 05	102.6	8.3	↓ ↓	0.228	0.092	19	6.86	33.68	393	104
BLR OUT 06	98.6	81	KENTUCKY COAL AS FOUND	0.699	0.314	153	5.06	59.08	946	95
STACK 06	98.6	8.7	↓	0.182	0.078	15	5.92	31.69	377	102
BLR OUT 07	84.9	8.7	OHIO COAL	0.462	0.193	85	6.77	51.34	856	100
STACK 07	84.9	9.2	↓	0.167	0.067	12	6.77	28.85	350	101
BLR OUT 08	73.1	9.0	KENTUCKY COAL	0.574	0.240	87	7.45	40.87	700	98
STACK 08	73.1	9.2		0.114	0.047	6	6.73	21.42	267	104
BLR OUT 09	49.6	12.2		0.617	0.168	57	5.75	37.78	661	102
STACK 09	49.6	11.5	↓ ↓	0.185	0.054	7	6.15	19.41	245	102
BLR OUT 14	97.1	88	OHIO COAL HIGH O_2	0.984	0.349	193	6.28	58.64	942	98
STACK 14	97.1	9.0	↓ ↓	0.224	0.089	17	7.67	31.73	373	103

PARTICULATE

DATA

Leak Check Rate

Vac in. Hg   ft³/min

Before

After

Sampling Time Per Point, Min
7 1/2

ISOKINETICS = 95.1 %

TEST NUMBER 1

DATE 6-3-79

OPERATOR J D

FUEL [illegible]

SITE 3

PROBE LOCATION [illegible]

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O₂, %	Vac.
		ΔPs	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
1		.22	1.40	5621.78	480	280	250	--	—	98		8.5
2		.22	1.40	5628.25	490	350	220			100		8.5
3		.15	.94	5633.51	460	350	300			102		6.0
4		.15	.94	5638.76	440	320	312			110		6.0
5		.27	1.70	5645.65	460	200	200			115		10.0
6		.23	1.45	5654.00	500	250	250			120		8.7
7	+10 sec	.20	1.25	5658.04	480	200	360			120		7.7
8		.20	1.25	5663.92	480	200	310			120		7.7
	60.7											
Average		0.205	1.29		934°R 474°F					683°R 223°F		

METER VOL. END 5663.92

START 5615.35

SAMPLE VOL. 48.57 ft³

C pitot	Stack Press. ~~in. Hg Gauge~~	Barometric Pressure
.837	-0.78" H₂O	29.52

Percent O₂ =

Nomograph Setup

P_{meter} =   C =

P_{stack} = T_{stack} =

T_{meter} =   ΔP =

ΔHg =   Noz(Ideal) = .370

% H₂O =   Noz(Actual) = .378

V_s = 33.61 ft/sec

Y = .30

Imp.	Vol.(End)		Vol. (Start)		ΔVol.(ml)
#1	134	-	100	=	34
#2	111	-	100	=	11
#3	0	-	0	=	0
				Total	45
#4	g(End)		g(Start)		Δgrams
Silica Gel	144	-	130	=	14
				Total Vol. H₂O	59 ml

PARTICULATE

DATA

Sampling Time Per Point, Min
3.0

Leak Check Rate

	Vac in. Hg	ft^3/min
Before		
After		

ISOKINETICS = ______ %

TEST NUMBER 1

DATE 5-3-79

OPERATOR R.A.P

FUEL OHIO

SITE J

PROBE LOCATION STACK

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O$_2$,%	Vac.
		ΔP$_s$	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
NE-1	13.30	,08	.58	5298.62	318	240	310		88	85		<2.0
2		,08	.58	5300.35	315	250	310		80	100		<2.0
3		,11	,80	5302.33	320	255	310		80	100		2.0
4		.72	.87	5304.38	320	250	310		75	100		2.0
5		.13	,90	5306.45	320	250	300		80	102		2.0
6		.13	.90	5308.51	320	255	300		82	108		2.0
7		,10	.70	5310.38	320	260	280		78	102		<2.0
8		.07	,48	5311.81	310	255	285		75	105		<2.0
9		,07	.48	5313.35	310	250	270		82	110		<2.0
10		.07	.48	5314.75	310	250	285		80	115		<2.0
11		.07	.48	5316.[illegible]9	310	250	290		80	118		2.0
12		.07	.48	5317.68	—	250	285		82	118		<2.0
NW-1		.09	,60	5319.40	320	220	270		82	115		<2.0
2		,10	,68	5321.20	320	220	270		82	118		<2.0
3		,11	.75	5323.06	325	250	270		88	120		<2.0
4	3.25	.11	,75	5325.13	330	250	265		88	118		<2.0
5		.12	.82	5327.10	330	250	260		80	118		<2.0
6		.11	,75	5328.97	325	250	270		80	115		<2.0
7		.09	,60	5330.60	322	250	270		82	115		<2.0
8		,06	,41	5332.02	320	250	275		85	115		<2.0
9		,10	,68	5333.76	320	260	265		90	115		<2.0
10		,09	,60	5335.49	318	250	270		90	115		<2.0
11		,05	.34	5336.73	—	235	270		90	115		<2.0
12		.08	.55	5338.404	—	250	290		90	120		<2.0
Average		.092	.63	43.582	319							

METER VOL. END 5338.404
START 5296.960
SAMPLE VOL. 41.582 ft^3

C$_{pitot}$	Stack Press. In. Hg-Gauge	Barometric Pressure
.837	29.52	

-0.12

Percent O$_2$ =

Nomograph Setup

P$_{meter}$ =
C =
P$_{stack}$ =
T$_{stack}$ =
T$_{meter}$ =
ΔP =
ΔH$_g$ =
Noz(Ideal)=
% H$_2$O = 5.3
Noz(Actual)= .375

Imp.	Vol.(End)		Vol. (Start)		ΔVol.(ml)
#1	133	-	100	=	33
#2	105	-	100	=	5
#3	0	-	0	=	0
				Total	38
#4 Silica Gel	g(End)		g(Start)		Δgrams
	148.5	-	130	=	12.5

Total Vol. H$_2$O 50.5 ml

PARTICULATE

DATA

Leak Check Rate

	Vac in. Hg	ft³/min
Before		
After		

Sampling Time Per Point, Min
7 1/2

ISOKINETICS = 102 %

TEST NUMBER 2
DATE 6-4-79
OPERATOR J D
FUEL OH10
SITE J
PROBE LOCATION Baile-Out #4

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O₂, %	Vac.
		ΔP_s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
1		.52	1.61	5351.36	500	200	250			110		5.2
2		.57	1.80	5357.85	500	200	250			110		9.8
3		.49	1.51	5364.43	480	200	280			120		9.8
4		.48	1.50	5371.97	500	200	280			123		9.8
5	*	.50	1.58	5680.00 5686.70	540	200	260			105		10.0
6		.54	1.70	5693.64	530	200	300			105		11.3
7		.50	1.58	5700.71	530	200	280			110		10.0
8		.34	1.10	5706.33	500	190	310			115		7.0
	60.5											
Average		0.4625	1.5475		510F 970R							

METER VOL. END
START 5344.37
SAMPLE VOL. ft³

P_{itot}	Stack Press. In Hg-Gauge	Barometric Pressure
.837	-0.025" Hg	29.42

Percent O₂ =

Nomograph Setup

P_{meter} =
P_{stack} =
T_{meter} =
ΔH_g =
% H_2O = 5.1

C =
T_{stack} =
ΔP =
Noz(Ideal) =
Noz(Actual) = .316

V_s - 53.17
F = .6

Imp.	Vol.(End)		Vol.(Start)		ΔVol.(ml)
#1	138	-	100	=	38
#2	108	-	100	=	8
#3	0	-	0	=	0
				Total	46
#4 Silica (g)	g(End) 143.8	-	g(Start) 130	=	Δgrams 13.8
				Total Vol. H₂O	59.8 ml

PARTICULATE

DATA

Sampling Time Per Point, Min
5.0

Before

After

Leak Check Rate

Vac in. Hg ft³/min

ISOKINETICS = 95.7

TEST NUMBER 2 1st comp.
DATE 6-4-74
OPERATOR R.H.P
FUEL OHIO
SITE J
PROBE LOCATION Stack

Sample Point	Time	METER CONDITIONS			TC TEMPERATURES, °F						O₂, %	Vac.
		ΔP_s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
NE 1	14:25	.19	1.30	2929.36	355	250	295					
2		.19	1.30	2933.67	350	260	350		70	98		2.2
3		.24	1.55	2938.33	355	260	310		70	98		2.2
4		.23	1.50	2942.95	355/345	260	305		73	100		2.8
5		.23	1.50	2947.47	355	265	295		72	100		2.7
6		.23	1.50	2952.00	355/348	260	285		76	102		2.5
7		.19	1.30	2956.28	360	260	290		75	105		3.0
8		.19	1.30	2960.43	360/	260	285		—	—		—
9		.18	1.150	2964.42	355	260	285		78	110		2.4
10		.18	1.15	2968.39	344/355	260	285		70	105		2.3
11		.18	1.15	2972.37	350	260	280		70	110		2.3
12		.13	.85	2975.79	—	250	270		70	110		2.3
									72	110		2.2
NW 1		.21	1.35	2980.23	364/355	260	280		70	105		3.3
2		.22	1.42	2984.58	360/364	260	290		75	110		3.2
3		.23	1.50	2989.11	360	270	285		78	105		3.4
4		.23	1.50	2994.03	352/365	270	285		72	100		3.4
5		.21	1.45	2998.34	360	270	285		72	101		3.4
6		.23	1.60	3003.12	353/360	270	285		72	100		3.6
7		.21	1.50	3007.65	360	270	285		72	98		3.3
8		.20	1.40	3012.09	365/370	260	285		72	98		3.2
9		.20	1.40	3016.51	370	250	275		72	98		3.5
10		.19	1.35	3020.93	370	250	280		73	100		3.3
11		.19	1.35	3025.28	365	260	280		73	100		3.8
12		.13	.90	3028.905	—	270	285		73	99		2.8
Average	.20	1.34	103.897	360	—				98			

METER VOL. END 3028.905
START 2925.008
SAMPLE VOL. 103.897 ft³

C pitot	Stack Press In. Hg-Gauge	Barometric Pressure
.817	-.02" H₂O	29.36

Percent O₂ =

Nomograph Setup

T_{meter} = C =
T_{stack} = T_{stack} =
T_{meter} = ΔP =
ΔH_g = 5.5 Noz(Ideal) = .377 in
% H_2O = Noz(Actual) =

Imp.	Vol.(End)		Vol.(Start)		ΔVol.(ml)
#1	172	-	100	=	72
#2	135	-	100	=	35
#3	1	-	0	=	1
				Total	108
#4 Silica gel	c(End)		c(Start)		Δgrams
	214	-	200.0	=	14

Total Vol. H_2O 122 ml

PARTICULATE

DATA

Leak Check Rate

	Vac in. Hg	ft³/min
Before		
After		

Sampling Time Per Point, Min
7 1/2

ISOKINETICS = 105 %

TEST NUMBER 5
DATE 6-13-79
OPERATOR JO
FUEL OMO
SITE J
PROBE LOCATION B. Ter Out

1.05%

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O₂, %	Vac.
		ΔP$_s$	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
1		.56	.53	5725.98	550	150	280			100		4.1
2		.72	.68	5730.49	560	150	310			100		4.6
3		.70	.65	5734.75	560	180	300			100		5.0
4		.58	.55	5738.73	520	150	300			100		4.5
5	*	.60	.56	5371.55 5375.15								5.0
6		.68	.64	5379.67								5.2
7		.72	.67	5384.15								5.5
8		.64	.60	5388.34								5.0
Average		.65	.61	16.870 17.204	548							

METER VOL. END
START 5721.86
SAMPLE VOL. 34.014 ft³

C$_{pitot}$	Stack Press. In. Hg-Gauge	Barometric Pressure
.837	-2.0" H$_2$O	29.70

Percent O$_2$ =

Nomograph Setup

T$_{meter}$ = C =
T$_{stack}$ = T$_{stack}$ =
T$_{meter}$ = ΔF =
ΔH$_g$ = Noz(Ideal)=
% H$_2$O = 7.6 Noz(Actual)= .235

F = 2.0

Imp.	Vol. (End)		Vol. (Start)		ΔVol. (ml)
#1	142	-	100	=	42
#2	108	-	100	=	8
#3	0	-	0	=	0
				Total	50
#4	g(End)		g(Start)		Δgrams
Silica Gel	139	-	130	=	9
				Total Vol. H$_2$O	59 ml

PARTICULATE

DATA

Leak Check Rate

Vac in. Hg	ft^3/min
Before	
After	

ISOKINETICS = 96.2 %

Sampling Time Per Point, Min
3.0

TEST NUMBER 5

DATE 618-77

OPERATOR RAP

FUEL OHIO

SITE J

PROBE LOCATION STACK-#4

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O$_2$, %	Vac.
		ΔP$_s$	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
NE-1	15:30	.30	.96	3042.57	365	220	300		68	75		3.5
2		.33	1.05	3045.02	370	250	300		65	75		3.8
3		.32	1.01	3047.36	370	260	305		68	78		3.5
4		.29	.93	3049.62	375	240	305		65	80		3.2
5		.28	.90	3051.86	380	250	300		67	80		3.2
6		.26	.84	3054.05	380	250	295		63	80		3.0
7		.24	.77	3056.12	380	260	290		63	83		3.0
8		.21	.67	3058.02	370	260	290		62	82		2.8
9		.20	.64	3059.86	365	255	295		63	88		2.4
10		.24	.73	3061.84	370	250	295		63	88		2.6
11		.20	.60	3063.12	360	250	290		62	88		2.2
12		.17	.52	3065.32	—	245	285		62	80		2.0
NW-1		.28	.85	3067.41	365	220	250		72	90		3.0
2		.27	.81	3069.48	365	250	255		68	90		3.0
3		.26	.79	3071.50	365	280	270		65	91		3.0
4		.26	.79	3074.52	360	285	272		65	92		2.9
5		.25	.75	3075.49	360	280	275		68	92		2.8
6		.25	.75	3077.46	360	280	275		68	92		2.8
7		.23	.70	3079.35	360	280	275		70	92		2.8
8		.21	.64	3081.14	365	280	275		70	92		2.5
9		.21	.64	3082.94	365	280	275		70	93		2.5
10		.22	.67	3084.76	365	270	270		71	95		2.5
11		.22	.67	3086.59	360	275	275		71	96		2.5
12		.15	.46	3088.125	—	270	270		71	96		2.0
Average		.243	.75	47.897	367				87 →			

3040.228

METER VOL. END

START 3040.228

SAMPLE VOL. ft^3

C$_{pitot}$	Stack Press. In. Hg-Gauge	Barometric Pressure
.817	-.26" H$_2$O	29.70

Percent O$_2$ =

Nomograph Setup

P$_{meter}$ =

P$_{stack}$ =

T$_{meter}$ =

ΔH$_g$ =

% H$_2$O = 6.8

C =

T$_{stack}$ =

ΔP =

Noz(Ideal) =

Noz(Actual) =

= .312

9 - .60 = 39

Imp.	Vol.(End)		Vol. (Start)		ΔVol.(ml)
#1	149	-	100	=	49
#2	114	-	100	=	14
#3	0	-	0	=	0
				Total	
#4 Silica Gel	g(End)		g(Start)		Δgrams
	211	-	200	=	11

Total Vol. H$_2$O 74 ml

PARTICULATE

DATA

Sampling Time Per Point, Min
10

Leak Check Rate

Vac in. Hg ft^3/min

Before

After

ISOKINETICS = 96.0

TEST NUMBER 6

DATE

OPERATOR JD

FUEL Kent

SITE J

PROBE LOCATION Boiler out

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O_2,%	Vac.
		ΔP_s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
+ B 1	10	.48	1.31	5401.68	1							5.7
1.0516 2	10	.52	1.41	5410.10	550							6.2
3	13	.69	1.90	5422.35								8.5
4	13	.74	2.00	5434.42								9.0
				5746.75	1							
+14 sec A 5	13	.54	1.50	5758.27		180	208			98		7.5
6	13	.61	1.70	5770.15								
7	13	.65	1.80	5782.13		220	220			120		7.2
8	13	.50	1.40	5792.51	↓							
Average		.51	1.62	43.021 / 15.760	550							

METER VOL. END

START 5362.51

SAMPLE VOL. 80.73 ft^3

C_{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.837	-1.25 "H2O	29.58

Percent O_2 =

Nomograph Setup

T_{meter} =

P_{stack}

T_{meter} =

$\Delta H_@$ =

% H_2O = 5.0

C =

T_{stack} =

ΔP =

Noz(Ideal)=

Noz(Actual)= .316

=

Y = .68

Imp.	Vol. (End)		Vol. (Start)		ΔVol. (ml)
#1	140	-	100	=	40
#2	128	-	100	=	28
#3	0	-	0	=	0
				Total	68
#4	g(End)		g(Start)		Δgrams
Silica Gel	162	-	130	=	32
				Total Vol. H_2O	100 ml

Meter corr B* 1.0516

PARTICULATE

DATA

Leak Check Rate

	Vac in. Hg	ft^3/min
Before		
After		

Sampling Time Per Point, Min
4.0

ISOKINETICS = ______ %

TEST NUMBER 6
DATE 6-13-79
OPERATOR R.A.P.
FUEL KENT.
SITE J
PROBE LOCATION STACK #4

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O_2, %	Vac.
		ΔP_s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
NE-1	11:11	.25	.78	3091.07	355	260	260		70	82		2.8
2		.17	.53	3093.38	350	265	265		65	82		2.2
3		.23	.72	3096.02	345	265	270		55	82		2.5
4		.23	.72	3098.65	355	250	280		55	85		2.5
5		.23	.72	3101.32	350	265	280		53	85		2.5
6		.23	.72	3103.95	350	265	280		53	88		3.5
7		.21	.65	3106.42	355	255	270		55	90		3.5
8		.19	.61	3108.79	360	260	260		57	92		3.0
9		.23	.72	3111.42	355	245	245		60	91		3.8
10		.21	.65	3113.94	350	250	250		58	91		3.5
11		.21	.65	3116.43	350	255	250		58	91		3.5
12		.16	.50	3118.60	—	260	250		58	92		2.8
NW-1		.24	.75	3121.32	355	220	230		62	95		
2		.26	.81	3124.06	360	255	245		58	95	*	4.0
3		.25	.74	3126.64	360	285	250		59	96		3.9
4		.28	.82	3129.38	360	280	260		59	97		4.0
5		.25	.74	3131.96	365	280	270		62	98		3.8
6		.25	.74	3134.52	365	280	270		62	100		3.9
7		.22	.64	3136.93	365	280	270		63	101		3.5
8		.22	.64	3139.35	360	280	275		63	102		3.5
9		.22	.64	3141.73	360	280	280		64	102		3.5
10		.22	.64	3144.17	360	275	285		65	102		3.5
11		.21	.62	3146.49	355	280	285		67	104		3.2
12		.15	.44	3148.468	—	275	300		68	105		3.4
Average		.22	.67	60.202	356					93.6	—	

METER VOL. END
START 3088.266
SAMPLE VOL. ft^3

C_{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.817	-.26" H_2O	29.88

Percent O_2 =

Nomograph Setup

P_{meter} =
P_{stack} =
T_{meter} =
ΔH_g =
% H_2O =

C =
T_{stack} =
ΔP =
Noz(Ideal)=
Noz(Actual)= .312

Imp.	Vol.(End)		Vol. (Start)		ΔVol.(ml)
#1	154	-	100	=	54
#2	112	-	100	=	12
#3	1	-	0	=	1
				Total	67
#4	g(End)		g(Start)		Δgrams
Silica Gel	143	-	130	=	13
				Total Vol. H_2O	80 ml

* NOMO CHANGE .63

PARTICULATE

DATA

Sampling Time Per Point, Min
7 1/2

Leak Check Rate

	Vac in. Hg	ft^3/min
Before		
After		

ISOKINETICS = 100 %

Filter #15

TEST NUMBER 7
DATE 6-10-79
OPERATOR J D
FUEL OIL
SITE J
PROBE LOCATION Bottom out

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O_2, %	Vac.
		ΔP_s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
A 1		.32	.91	5811.65	510	150	310			100		4.1
2		.47	1.35	5817.62	520	180	310			101		5.2
3		.50	1.41	5823.90	535	180	300			110		5.3
4		.40	1.13	5829.50	490	180	300			110		4.5
				5445.00								
* B 1		.48	1.37	5451.34	500	150	250			110		5.1
2		.49	1.40	5457.59	520	200	270			111		5.3
3		.53	1.50	5464.11	500	210	300			118		6.0
4		.50	1.41	5470.34	500	195	300			122		5.5
Average		.46	1.31	24.22 / 26.647	969							

METER VOL. END
START 5805.28
SAMPLE VOL. 50.867 ft^3

C_{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.837	−1.25	29.85

Percent O_2 =

Nomograph Setup

P_{meter} =
P_{stack} =
T_{meter} =
$\Delta H_@$ =
% H_2O =

C =
T_{stack} =
ΔP =
Noz(Ideal) =
Noz(Actual) = .316
Y = .66

Imp.	Vol. (End)		Vol. (Start)		ΔVol. (ml)
#1	153	-	100	=	53
#2	112	-	100	=	12
#3	0	-	0	=	0
				Total	65
#4 Silica Gel	g(End) 143	-	g(Start) 130	=	Δgrams 13
				Total Vol. H_2O	78 ml

* meter corr. 1.05%

PARTICULATE

DATA

Leak Check Rate

	Vac in. Hg	ft^3/min
Before		
After		

ISOKINETICS = ________ %

Sampling Time Per Point, Min
3.0

TEST NUMBER 7
DATE 6-14-79
OPERATOR R.AP
FUEL KENT.
SITE J
PROBE LOCATION STACK #4

Filter #10

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O$_2$,%	Vac.
		ΔP$_s$	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
NE-1	11:00	.16	.48	3154.128	330	265	310		70	82		2.3
2		.18	.55	3155.86	330	260	320		68	82		2.5
3		.19	.59	3157.63	335	260	300		65	84		2.6
4		.18	.55	3159.39	335	260	295		65	84		2.5
5		.20	.61	3161.25	335	260	285		62	87		2.6
6		.21	.64	3163.09	340	260	280		63	89		2.9
7		.20	.61	3164.91	340	255	280		63	90		2.8
8		.18	.55	3166.61	340	260	280		63	92		2.5
9		.17	.52	3168.32	340	255	280		65	92		2.4
10		.17	.52	3169.95	340	260	270		68	94		2.4
11		.17	.52	3171.[illegible]	335	260	270		67	95		2.4
12		.15	.46	3173.20	—	255	275		67	98		2.0
NW-1		.20	.61	3175.01	340	220	250		71	100		2.7
2		.20	.61	3176.79	—	—	—		—	—	—	—
3		.21	.64	3178.61	345	270	270		65	100		2.8
4		.21	.64	3181.44	345	265	265		66	100		2.8
5		.22	.66	3182.28	345	260	270		66	100		3.0
6		.21	.64	3184.09	345	265	270		68	101		3.0
7		.19	.57	3185.75	—	—	—		—	—	—	—
8		.19	.57	3187.45	345	260	270		70	102		2.5
9		.20	.60	3189.17	350	250	270		70	102		2.6
10		.18	.54	3190.79	345	250	270		68	103		2.8
11		.16	.48	3192.35	340	250	270		68	105		2.3
12		.11	.33	3193.622	—	250	270		68	105		2.0
Average		.185	.56	41.189	340	—	—	—	—	95	—	

METER VOL. END ____
START 3152.433
SAMPLE VOL. ____ ft^3

C$_{pitot}$	Stack Press. In. Hg-Gauge	Barometric Pressure
.817	-.21" H$_2$O	29.85

Percent O$_2$ = ____

Nomograph Setup

P$_{meter}$ =
P$_{stack}$ =
T$_{meter}$ =
ΔH$_g$ =
% H$_2$O =

C =
T$_{stack}$ =
ΔP =
Noz(Ideal) =
Noz(Actual) =

Imp.	Vol.(End)		Vol. (Start)		ΔVol.(ml)
#1	144	-	100	=	44
#2	109	-	100	=	9
#3	1	-	0	=	1
				Total	54
#4	g(End)		g(Start)		Δgrams
Silica Gel	139	-	130	=	9

Total Vol. H$_2$O 63 ml

PARTICULATE

DATA

Leak Check Rate

Vac in. Hg ft^3/min

Before

After

ISOKINETICS = ______ %

Sampling Time Per Point, Min
7½

TEST NUMBER 8

DATE 6-15-76

OPERATOR JD

FUEL Kent

SITE J

PROBE LOCATION Boiler-Out

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O$_2$, %	Vac.
		ΔP_s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
* B 1		.30	.85	5479.41	460	150	280			105		3.9
2		.29	.81	5485.80	480	180	290			110		3.7
3		.32	.90	5489.83	460	190	290			115		4.0
4		.34	.96	5495.13	480	150	300			120		4.2
				5841.22								
A 1		.26	.74	5845.48	480	150	250			100		3.9
2		.30	.85	5851.04	500	190	280			100		4.1
3		.28	.79	5855.85	510	180	280			105		4.0
4		.28	.74	5860.55	490	170	300			110		4.1
Average		0.297	0.837	21.3685 19.33	483°F							

METER VOL. END

START 5474.81

SAMPLE VOL. 41.1644 ft^3

C_{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.837	- 5/8	29.80

Percent O$_2$ =

Nomograph Setup

F_{meter} = C =

F_{stack} = T_{stack} =

T_{meter} = ΔT =

ΔHg = Noz(Ideal)=

% H$_2$O = 8.6 Noz(Actual)= .316

F = .66 =

* meter corr. 1.0516

Imp.	Vol. (End)		Vol. (Start)		ΔVol. (ml)
#1	150	-	100	=	50
#2	109	-	100	=	9
#3	0	-	0	=	0
				Total	59
#4	g(End)		g(Start)		Δgrams
Silica Gel	140	-	130	=	10
				Total Vol. H$_2$O	69 ml

PARTICULATE

DATA

Sampling Time Per Point, Min
3.0

Leak Check Rate

Vac in. Hg ft^3/min

Before

After

6-11- 1145

ISOKINETICS = ______ %

TEST NUMBER B
DATE 6-15-79
OPERATOR R.AP
FUEL KENT.
SITE J
PROBE LOCATION STACK #4

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O$_2$,%	Vac.
		ΔP_s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
NE-1	10:25	.09	.70	3198.25	310	250	290		80	85		4.8
2		.11	.85	3200.39	310	260	285		70	86		5.5
3		.09	.70	3202.35	310	260	290		70	88		4.8
4		.10	.75	3204.33	315	240	250		78	90		4.7
5		.12	.90	3206.52	320	250	250		68	90		5.5
6		.14	1.05	3208.89	320	260	255		70	90		6.1
7		.12	.90	3211.09	320	260	255		70	91		5.2
8		.12	.90	3213.27	320	260	255		71	95		5.2
9		.10	.75	3215.23	320	265	260		72	95		4.5
10		.09	.67	3217.07	320	265	255		72	97		4.0
11		.09	.67	3218.90	310	260	255		70	100		3.8
12		.05	.38	3220.32	—	265	260		70	100		2.3
NW-1		.10	.75	3222.29	310	220	220		78	100		4.5
2		.10	.75	3224.29	315	240	240		70	101		4.5
3		.12	.85	3226.35	320	250	240		72	101		4.8
4		.11	.78	3228.31	320	255	245		72	102		4.5
5		.10	.71	3230.18	322	260	250		72	102		4.0
6		.13	.92	3232.32	325	260	255		71	102		5.0
7		.12	.85	3234.37	320	255	260		70	103		4.8
8		.13	.92	3236.47	320	255	260		72	103		4.8
9		.12	.85	3238.53	320	255	265		72	103		4.7
10		.12	.85	3240.58	320	255	275		72	103		4.7
11		.09	.64	3242.37	315	250	280		73	104		3.6
12		.05	.36	3243.653	—	250	275		75	105		2.0
Average		.105	.769	47.375	317							

METER VOL. END ______
START 3196.278
SAMPLE VOL. ______ ft^3

C_{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.817	-.06" H$_2$O	29.80

Percent O$_2$ = ______

Nomograph Setup

P_{meter} =
P_{stack} =
T_{meter} =
ΔH_g =
% H_2O = 6.7

C =
T_{stack} =
ΔP =
Noz(Ideal) =
Noz(Actual) = .377

Imp.	Vol.(End)		Vol. (Start)		ΔVol.(ml)
#1	152	-	100	=	52
#2	110	-	100	=	10
#3		-	0	=	
				Total	62
#4	g(End)		g(Start)		Δgrams
Silica Gel	140	-	130	=	10

Total Vol. H$_2$O 72 ml

PARTICULATE

DATA

Leak Check Rate

Vac
in. Hg ft^3/min

Before

After

ISOKINETICS = ________%

Sampling Time Per Point, Min.
7 1/2

TEST NUMBER 9
DATE 6-16-79
OPERATOR JD
FUEL Kent
SITE J
PROBE LOCATION Boiler Out

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O$_2$,%	Vac.
		ΔP$_s$	ΔH	Meter Reading	Stack	Probe	Oven	Impingers		Meter		
								In	Out			
A 1		,24	.68	5878.71	460	150	240			100		2.8
2		.27	.77	5883.55	480	180	270			105		3.0
3		.22	.62	5887.83	480	190	290			110		2.6
4		.24	.68	5892.26	460	180	300			112		2.8
				5500.00								
* B 1		.28	.79	5505.90	440	150	200			111		2.8
2		.31	.87	5510.98	460	180	250			195		3.0
3		.42	1.20	5515.85	460	180	290			120		3.7
4		.38	1.09	5521.46	440	180	320			122		3.5
Average		.26	.83		920°R							

METER VOL. END
START
SAMPLE VOL. ft^3

C$_{pitot}$	Stack Press. ~~In. Hg Gauge~~	Barometric Pressure
.837	-.78"H$_2$O	29.69

Percent O$_2$ =

Nomograph Setup

P$_{meter}$ =
P$_{stack}$ =
T$_{meter}$ =
ΔHg =
% H$_2$O =

C =
T$_{stack}$ =
ΔP =
Noz(Ideal)=
Noz(Actual)= .316

pH 1.6
pH 7.5

Imp.	Vol.(End)		Vol. (Start)		ΔVol.(ml)
#1	135	-	100	=	35
#2	107	-	100	=	7
#3	6	-	0	=	0
				Total	42
#4	g(End)		g(Start)		Δgrams
Silica Gel	140	-	130	=	10
				Total Vol. H$_2$O	52 ml

Y = .66

* meter corr 1.0516
Initial Imp water pH 5.3

PARTICULATE

DATA

Leak Check Rate

	Vac in. Hg	ft^3/min
Before		
After		

Sampling Time Per Point, Min
3.0

ISOKINETICS = _______ %

TEST NUMBER 9
DATE 6-16-75
OPERATOR RAP
FUEL Kent.
SITE J
PROBE LOCATION Stack

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O_2, %	Vac.
		ΔP_s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
NE 1	10:18	.08	.56	3249.62	300	280	320		72	90		2.5
2		.08	.56	3251.37	300	260	320		70	90		2.4
3		.09	.64	3253 28	300	260	320		68	91		2.9
4		.11	.78	32 55 32	300	265	315		70	91		3.2
5		.11	.78	3257,35	305	265	310		70	92		3.2
6		.10	.71	3259.31	305	260	310		70	92		3.0
7		.09	.64	3261.18	305	265	310		71	93		2.8
8		.06	.43	3262.68	305	260	305		70	97		2.0
9		.07	.50	3264,36	295	265	305		65	95		2.2
10		.05	.36	3265.68	295	265	310		62	97		<2.0
11		.05	.36	3267.13	290	260	300		61	97		<2.0
12		.05	.36	3268.48	—	260	300		60	98		<2.0
1		.07	.50	3270 14	305	220	280		72	102		—
2		.09	.64	3272.00	305	250	280		65	102		2.7
3		.11	.78	3274.01	305	270	275		68	102		2.0
4		.12	.85	3276.14	305	260	280		68	103		3.3
5		.10	.71	3278.05	310	260	270		67	103		2.9
6		.11	.77	3280.02	305	265	275		65	102		3.1
7		.14	1.0	3287.27	310	270	275		63	103		4.0
8		.12	.85	3284.35	315	265	270		68	110		3.8
9		.10	.71	3286.30	310	260	270		70	110		3.3
10		.07	.50	3287.86	310	250	270		70	110		2.3
11		.07	.50	32 89.46	300	250	270		70	110		2.3
12		.05	.36	3290.808	—	250	265		71	111		<2.0
Average		.087	.62	42.958	303°F					95°F		

METER VOL.	
END	
START	
SAMPLE VOL.	ft^3

C_{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.817	-.12" H_2O	29.69

Percent O_2 =

Nomograph Setup

P_{meter} =
P_{stack} =
T_{meter} =
ΔH_g =
% H_2O =

C =
T_{stack} =
ΔP =
Noz(Ideal) = .377
Noz(Actual) =

Imp.	Vol. (End)		Vol. (Start)		ΔVol. (ml)
pH 1.6 #1	140	-	100	=	40
pH 2.5 #2	108	-	100	=	8
#3	1	-	0	=	1
				Total	49
#4	g(End)		g(Start)		Δgrams
Silica (g)	140	-	130	=	10
				Total Vol. H_2O	59 ml

Initial Imp. pH 5.3

PARTICULATE

DATA

Sampling Time Per Point, Min
10

Leak Check Rate

	Vac in. Hg	ft^3/min
Before		
After		

ISOKINETICS = ______ %

TEST NUMBER 14
DATE 6/20/79
OPERATOR JD
FUEL Oil
SITE J
PROBE LOCATION Boiler Out

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O$_2$, %	Vac.
		ΔP$_s$	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
A 1		.56	3.50	5916.00	530	250	340			100		12.0
2		.68	4.30	5930.54	530	250	340			105		15.0
3		.50	3.20	5943.45	530	250	310			105		11.0
4		.52	3.30	5956.30	520	250	300			110		12.0
B 1		5.0	3.20	5969.15	520	180	230			110		12.0
2		6.8	4.30	5983.23	540	260	280			110		22.0
3		7.0	4.40	5996.47	590	290	300			110		22.0
4		5.3	2.40	6008.26	540	250	300			110		20.0
Average		.58	3.7		537.5							

METER VOL. END
START 5903.35
SAMPLE VOL. 105.41 ft^3

C$_{Pitot}$	Stack Press. In. Hg-Gauge	Barometric Pressure
.877		29.67

Percent O$_2$ =

Nomograph Setup

P$_{meter}$ =
P$_{sta}$ =
T$_{meter}$ =
ΔHg =
% H$_2$O =

C =
T$_{stack}$ =
ΔP =
Noz(Ideal)=
Noz(Actual)= .377
P = .30

Imp.	Vol. (End)		Vol. (Start)		ΔVol. (ml)
ph 1.0 #1	185	-	100	=	85
ph 2.5 #2	136	-	100	=	36
#3	0	-	0	=	0
				Total	121
#4	g(End)		g(Start)		Δgrams
Silica Gel	158	-	130	=	28
				Total Vol. H$_2$O	149 ml

PARTICULATE

DATA

comp. Test #2

Sampling Time Per Point, Min	5.0

Leak Check Rate

	Vac in. Hg	ft³/min
Before		-
After		

ISOKINETICS = ______%

TEST NUMBER 14
DATE 6-20-79
OPERATOR RAP
FUEL OHIO
SITE J
PROBE LOCATION Stack #4

SEVERE STORM

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O₂,%	Vac.
		ΔPs	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
NE 1	11:45	.22	.64	3297.89	350	250	250		82	88		3.5
2		.27	.80	3301.38	360	270	260		82	90		4.2
3		.27	.80	3304.76	365	270	265		63	90		4.2
4	*	.26	.77	3308.16	365	265	265		64	91		4.0
5		.25	.73	3311.42	365	230	230		68	94		3.9
6		.22	.65	3314.50	365	240	240		64	96		3.7
7		.22	.65	3317.55	365	250	250		67	98		3.7
8		.23	.67	3320.64	360	260	250		68	98		3.8
9		.18	.53	3323.44	353	260	255		65	100		3.2
10		.19	.56	3326.28	350	655	260		65	101		3.3
11		.19	.56	3329.11	345*	260	270		64	102		3.3
12		.16	.47	3331.62	—	260	270		65	102		3.0
NW 1	6min	.20	.63	3385.32	360	240	245		78	105	*	4.0
→ *2	2min	.21	.67	3338.50	355	270	—		65	101		4.0
3		.25	.79	3342.02	365	260	260		62	82		4.8
4		.25	.79	3345.41	365	280	270		62	90		4.7
5		.24	.75	3348.73	365	280	270		62	91		4.5
6		.22	.67	3351.84	365	265	265		65	92		4.3
7		.20	.62	3354.85	365	250	265		68	95		4.0
8		.20	.62	3357.82	365	265	265		68	98		4.0
9		.19	.54	3360.70	365	265	265		66	101		3.8
10		.20	.62	3363.66	365	265	270		65	102		4.0
11		.20	.62	3366.58	365	255	265		63	103		4.0
12		.17	.54	3369.366	—	250	260		65	105		3.7
—							—					
Average		.216	.68	71.664	—					96	—	

METER VOL. END
START 3294.702
SAMPLE VOL. ft³

Pitot	Stack Press. In. Hg-Gauge	Barometric Pressure
.817	- 28" H₂O	

Percent O₂ =

Nomograph Setup

T_{meter} = C =
T_{stack} = T_{stack} = pH 1.3
T_{meter} = ΔH = pH 2.5
ΔHg = Noz(Ideal)=
% H₂O = 7.7 Noz(Actual)= .313
=

Imp.	Vol. (End)		Vol. (Start)		ΔVol. (ml)
#1	191	-	100	=	91
#2	121	-	100	=	21
#3	0	-	0	=	0
				Total	112
#4 Silica (g)	g(End) 227	-	g(Start) 209	=	Δg(wt) 18
				Total Vol. H₂O	130

T = 59

* Hg therm. - 338

PARTICULATE LAB WORKSHEET

TEST NO. 1 BLR out (Inlet, Outlet) LOCATION Site J

Date _____ Box No. _____ Eng. _____

Test Description _____

Dry Gas Meter Vol (ft^3)

Final _____

Initial _____

Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—	—	—		
BEAKER NO.			25	23	1		
DATE WT.			—	—	—		
TARE WT.	1		95.9771	50.1574	.8510		
	2		95.9771	50.1572	.8513		
	3		95.9770	50.1569	.8514		
	4		—	—	—		
AVG.			95.9771	50.1572	0.8512		
POST TEST WTS.							
	1		96.0947	50.3647	.9570		
	2		96.0925	50.3640	.9561		
	3		96.0923	50.3639	.9554		
	4		—	—	—		
AVG.			96.0932	50.3642	0.9562		
Δ WT.			0.1161	0.2070	0.1050		

Δ Vlc = _____ ml

Δ DgV = _____ ft^3

Δ Mn 428.1 mgm

LOAD _____ klb/hr

O_2 _____ %

REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 1 MECH OUT (~~Inlet, Outle~~t) LOCATION Site J

Date ______ Box No. ______ Eng. ______

Test Description ______

Dry Gas Meter Vol (ft^3)

Final ______

Initial ______

Δ DgV ______

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—		—		
BEAKER NO.			26		2		
DATE WT.			—		—		
TARE WT.	1		97.0261		.7880		
	2		97.0262		.7882		
	3		97.0266		.7883		
	4		—		—		
AVG.			97.0263		0.7882		
POST TEST WTS.							
	1		97.0573		.8852		
	2		97.0540		.8840		
	3		97.0554		.8833		
	4		—		—		
AVG.			97.0556		0.8842		
Δ WT.			0.0293		0.096		

Δ Vlc = ______ ml

Δ DgV = ______ ft^3

Δ Mn 125.3 mgm

LOAD ______ klb/hr

O_2 ______ %

REMARKS: ______

PARTICULATE LAB WORKSHEET

TEST NO. 2 BLR OUT (Inlet, Outlet) LOCATION Site J

Date 6-4-79 Box No. ______ Eng. ______

Test Description ______

Dry Gas Meter Vol (ft^3)

Final ______

Initial ______

Δ DgV ______

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—	—	—		
BEAKER NO.			27	28	8		
DATE WT.			—	—	—		
TARE WT.	1		104.4577	50.3050	.7375		
	2		104.4578	50.3047	.7372		
	3		104.4586	50.3050	.7373		
	4		—	—	—		
AVG.			104.4580	50.3049	.7373		

POST TEST WTS.

	1		104.6151	50.9958	.8670		
	2		104.6129	50.9955	.8673		
	3		104.6131	50.9957	.8674		
	4		—	—	—		
AVG.			104.6137	50.9957	.8672		
Δ WT.			0.1557	0.6908	0.1299		

Δ Vlc = ______ ml LOAD ______ klb/hr

Δ DgV = ______ ft^3 O_2 ______ %

Δ Mn 976.4 mgm REMARKS: ______

PARTICULATE LAB WORKSHEET

STACK — COMPLIANCE TEST #1

TEST NO. 2 (Inlet, Outlet) LOCATION Site J - BLR #4)

Date 6-4-79 Box No. ______ Eng. ______

Test Description ______

Dry Gas Meter Vol (ft^3)

Final ______

Initial ______

Δ DgV ______

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—		—		
BEAKER NO.			22		3		
DATE WT.			—		—		
TARE WT.	1		102.1426		.7558		
	2		102.1427		.7559		
	3		102.1423		.7559		
	4		—		—		
AVG.			102.1425		.7559		
POST TEST WTS.							
	1		102.2759		1.0556		
	2		102.2762		1.0546		
	3		102.2761		1.0544		
	4		—		—		
AVG.			102.2761		1.0544		
Δ WT.			0.1336		0.2985		

Δ Vlc = ______ ml

Δ DgV = ______ ft^3

Δ Mn 432.1 mgm

LOAD ______ klb/hr

O_2 ______ %

REMARKS: ______

8830-5 rev.

PARTICULATE LAB WORKSHEET

TEST NO. 5 BLR OUT (~~Inlet, Outlet~~) LOCATION Side J

Date 6-12-79 Box No. ________ Eng. ________

Test Description ________

Dry Gas Meter Vol (ft^3)

Final ________

Initial ________

Δ DgV ________

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—	—	—		
BEAKER NO.			30	29			
DATE WT.			—	—	—		
TARE WT.	1		95.0103	50.2961	.9466		
	2		95.0104	50.2960	.9466		
	3		95.0112	50.2966	.9468		
	4		—	—	—		
AVG.			95.0106	50.2962	0.9467		

POST TEST WTS.

	1		95.9503	50.5578	1.0615		
	2		95.9488	50.5581	1.0583		
	3		95.9486	50.5587	1.0593		
	4		—		—		
AVG.			95.9492	50.5582	1.0597		
Δ WT.			0.9386	0.2620	0.1130		

Δ Vlc = ________ ml

Δ DgV = ________ ft^3

Δ Mn 1,313.6 mgm

LOAD ________ klb/hr

O_2 ________ ________ %

REMARKS: ________

8830-5 r

PARTICULATE LAB WORKSHEET

TEST NO. 5 MECH OUT (~~Inlet, Outlet~~) LOCATION Site J

Date 6-12-79 Box No. ______ Eng. ______

Test Description ______

Dry Gas Meter Vol (ft^3)

Final ______

Initial ______

Δ DgV ______

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—		—		
BEAKER NO.			32		5		
DATE WT.			—		—		
TARE WT.	1		97.7662		.7476		
	2		97.7660		.7478		
	3		97.7661		.7471		
	4		—		—		
AVG.			97.7661		.7475		

POST TEST WTS.

	1		97.8747		.9231		
	2		97.8751		.9234		
	3		97.8752		.9234		
	4		—		—		
AVG.			97.8750		0.9233		
Δ WT.			0.1089		0.1758		

Δ Vlc = ______ ml LOAD ______ klb/hr

Δ DgV = ______ ft^3 O_2 ______ %

Δ Mn 284.7 mgm REMARKS: ______

PARTICULATE LAB WORKSHEET

TEST NO. 6 BLR OUT (~~Inlet, Outlet~~) LOCATION Site J

Date 6-13-79 Box No. ______ Eng. ______

Test Description ______

Dry Gas Meter Vol (ft^3)

Final ______

Initial ______

Δ DgV ______

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—	—	—		
BEAKER NO.			36	34	4		
DATE WT.			—	—	—		
TARE WT.	1		95.9774	50.3270	.7895		
	2		95.9773	50.3270	.7893		
	3		95.9774	50.3271	.7893		
	4		—	—	—		
AVG.			95.9774	50.3270	0.7894		
POST TEST WTS.							
	1		96.2451	51.6351	1.0256		
	2		96.2453	51.6338	1.0263		
	3		96.2458	51.6337	1.0266		
	4		—	—	—		
AVG.			96.2454	51.6337	1.0262		
Δ WT.			0.2680	1.3067	0.2368		

Δ Vlc = ______ ml LOAD ______ klb/hr

Δ DgV = ______ ft^3 O_2 ______ %

Δ Mn 1811.5 mgm REMARKS: ______

PARTICULATE LAB WORKSHEET

TEST NO. 6 MECH (~~Inlet, Outlet~~) LOCATION Site J

Date 6-13-79 Box No. ________ Eng. ________

Test Description ________________________________

Dry Gas Meter Vol (ft^3)

Final ____________

Initial ____________

Δ DgV ____________

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—		—		
BEAKER NO.			33		6		
DATE WT.			—		—		
TARE WT.	1		104.3509		.7525		
	2		104.3511		.7526		
	3		104.3514		.7524		
	4		—		—		
AVG.			104.3511		0.7525		
POST TEST WTS.							
	1		104.4802		.9268		
	2		104.4806		.9268		
	3		104.4811		.9272		
	4		—		—		
AVG.			104.4806		0.9269		
Δ WT.			0.1295		0.1744		

Δ Vlc = ____________ ml LOAD ____________ klb/hr

Δ DgV = ____________ ft^3 O_2 ____________ %

Δ Mn 303.9 mgm REMARKS: ____________

PARTICULATE LAB WORKSHEET

BLR OUT

TEST NO. 7 (Inlet, Outlet) LOCATION Site J

Date ______ Box No. ______ Eng. ______

Test Description ______

Dry Gas Meter Vol (ft^3)

Final ______

Initial ______

Δ DgV ______

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—	—	—		
BEAKER NO.			38	35	15		
DATE WT.			—	—	—		
TARE WT.	1		104.4559	64.5799	.7384		
	2		104.4567	64.5801	.7385		
	3		104.4554	64.5801	.7387		
	4		—	—	—		
AVG.			104.4560	64.5800	.7385		

POST TEST WTS.

	1		104.6014	64.9283	.8836		
	2		104.6020	64.9273	.8823		
	3		104.6024	64.9283	.8805		
	4		—	—	—		
AVG.			104.6019	64.9280	0.8805		
Δ WT.			0.1459	0.3480	0.1420		

Δ Vlc = ______ ml

Δ DgV = ______ ft^3

Δ Mn 635.9 mgm

LOAD ______ klb/hr

O_2 ______ %

REMARKS: ______

PARTICULATE LAB WORKSHEET

TEST NO. 7 MECH OUT (Inlet, Outlet)
LOCATION Site J
Date
Box No.
Eng.
Test Description

Dry Gas Meter Vol (ft^3)
Final
Initial
Δ DgV

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—		—		
BEAKER NO.			39		10		
DATE WT.			—		—		
TARE WT.	1		95.5720		.7510		
	2		95.5711		.7508		
	3		95.5703		.7506		
	4		—		—		
AVG.			95.5711		.7508		

POST TEST WTS.

	1		95.6090		.8926		
	2		95.6087		.8917		
	3		95.6086		.8911		
	4		—		—		
AVG.			95.6088		.8914		
Δ WT.			0.0377		0.1406		

Δ Vlc = ml
Δ DgV = ft^3
Δ Mn 178.3 mgm

LOAD klb/hr
O_2 %
REMARKS:

8830-5 rev.

PARTICULATE LAB WORKSHEET

TEST NO. 8 BLR OUT (Inlet, Outlet) LOCATION Site J

Date ______ Box No. ______ Eng. ______

Test Description ______

Dry Gas Meter Vol (ft^3)

Final ______

Initial ______

Δ DgV ______

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—	—	—		
BEAKER NO.			40	31	16		
DATE WT.			—	—	—		
TARE WT.	1		97.0244	105.2116	.7344		
	2		97.0248	105.2118	.7342		
	3		97.0244	105.2118	.7337		
	4		—	—	—		
AVG.			97.0245	105.2115	.7341		

POST TEST WTS.

	1		97.1668	105.5810	.8545		
	2		97.1673	105.5809	.8547		
	3		97.1676	105.5814	.8537		
	4		—	—	—		
AVG.			97.1672	105.5811	.8543		
Δ WT.			0.1427	0.3696	0.1202		

Δ Vlc = ______ ml

Δ DgV = ______ ft^3

Δ Mn 632.5 mgm

LOAD ______ klb/hr

O_2 ______ %

REMARKS: ______

PARTICULATE LAB WORKSHEET

TEST NO. 8 MECH (Inlet, Outlet) LOCATION Site J

Date ____ Box No. ____ Eng. ____

Test Description ____

Dry Gas Meter Vol (ft^3)

Final ____

Initial ____

Δ DgV ____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—		—		
BEAKER NO.			42		11		
DATE WT.			—		—		
TARE WT.	1		95.0094		.5912		
	2		95.0100		.5910		
	3		95.0091		.5908		
	4		—		—		
AVG.			95.0095		.5910		

POST TEST WTS.

	1		95.0392		~~.7057~~		
	2		95.0402		.7046		
	3		95.0409		.7039		
	4		—		—		
AVG.			95.0401		.7043		
Δ WT.			0.0306		0.1133		

Δ Vlc = ____ ml LOAD ____ klb/hr

Δ DgV = ____ ft^3 O_2 ____ %

Δ Mn 143.9 mgm REMARKS: ____

8830-5 rev.

PARTICULATE LAB WORKSHEET

TEST NO. 9 BLR OUT (Inlet, Outlet) LOCATION Site J

Date ________ Box No. ________ Eng. ________

Test Description ________

Dry Gas Meter Vol (ft^3)
Final ________
Initial ________
Δ DgV ________

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—	—	—		
BEAKER NO.			50	41	17		
DATE WT.			—	—	—		
TARE WT.	1		104.4578	50.8311	.7896		
	2		104.4577	50.8310	.7895		
	3		104.4576	50.8306	.7897		
	4		—	—	—		
AVG.			104.4577	50.8309	.7896		

POST TEST WTS.

	1		104.6163	51.0025	~~.9019~~		
	2		104.6164	51.0026	.8999		
	3		104.6164	51.0025	.8991		
	4		—	—	—		
AVG.			104.6164	51.0025	.8995		
Δ WT.			0.1587	0.1716	0.1099		

Δ Vlc = ________ ml LOAD ________ klb/hr

Δ DgV = ________ ft^3 O_2 ________ %

Δ Mn 440.2 mgm REMARKS: ________

PARTICULATE LAB WORKSHEET

TEST NO. 9 MECH OUT (Inlet, Outlet) LOCATION Site J

Date ______ Box No. ______ Eng. ______

Test Description ______

Dry Gas Meter Vol (ft^3)

Final ______

Initial ______

Δ DgV ______

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—		—		
BEAKER NO.			55		18		
DATE WT.			—		—		
TARE WT.	1		95.9792		.5868		
	2		95.9791		.5867		
	3		95.9793		.5864		
	4		—		—		
AVG.			95.9792		.5866		

POST TEST WTS.

		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
	1		96.0125		~~.7059~~		
	2		96.0129		.7035		
	3		96.0130		.7037		
	4		—		—		
AVG.			96.0128		.7036		
Δ WT.			0.0336		0.1170		

Δ Vlc = ______ ml

Δ DgV = ______ ft^3

Δ Mn 150.6 mgm

LOAD ______ klb/hr

O_2 ______ %

REMARKS: ______

PARTICULATE LAB WORKSHEET

TEST NO. 14 BLR OUT (Inlet, Outlet) LOCATION Site J

Date ______ Box No. ______ Eng. ______

Test Description ______

Dry Gas Meter Vol (ft^3)

Final ______

Initial ______

Δ DgV ______

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—	—	—		
BEAKER NO.			56	37	21		
DATE WT.			—	—	—		
TARE WT.	1		95.0115	63.3967	.9317		
	2		95.0112	63.3970	.9315		
	3		95.0110	63.3970	.9316		
	4		—	—	—		
AVG.			95.0112	63.3969	.9316		

POST TEST WTS.

	1		95.2491	~~65.6075~~	1.2104		
	2		95.2501	65.6058	1.2114		
	3		95.2502	65.6057	1.2108		
	4		—	—	—		
AVG.			95.2498	65.6057	1.2109		
Δ WT.			0.2386	2.2088	0,2793		

Δ Vlc = ______ ml

Δ DgV = ______ ft^3

Δ Mn 2726.7 mgm

LOAD ______ klb/hr

O_2 ______ %

REMARKS: ______

PARTICULATE LAB WORKSHEET

TEST NO. 14 MECH OUT (Inlet, Outlet)   LOCATION Side J

Date ______   Box No. ______   Eng. ______

Test Description #2nd. COMPLIANCE

Dry Gas Meter Vol (ft^3)

Final ______

Initial ______

Δ DgV ______

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—		—		
BEAKER NO.			58		19		
DATE WT.			—		—		
TARE WT.	1		104.3524		.5840		
	2		104.3518		.5841		
	3		104.3521		.5839		
	4		—		—		
AVG.			104.3521		.5840		

POST TEST WTS.

	1		104.5261		~~.8578~~		
	2		104.5260		.8384		
	3		104.5261		.8383		
	4		—		—		
AVG.			104.5261		.8384		
Δ WT.			0.1740		0.2544		

Δ Vlc = ______ ml   LOAD ______ klb/hr

Δ DgV = ______ ft^3 O_2 ______ %

Δ Mn 428.4 mgm   REMARKS: ______

SECTION 3.0

GASEOUS DATA

PAGE

3.1 GASEOUS EMISSION SUMMARY 67

3.2 GASEOUS EMISSIONS DATA SHEETS 68

3.3 SOx DATA SHEETS 81

GASEOUS EMISSION SUMMARY

Location: TEST SITE J

Fuel: KENTUCKY AND OHIO

				BOILER OUTLET						STACK						
TEST NO.	DATE	LOAD %	CONDITIONS	O_2 % Dry	CO_2 % Dry	CO ppm Dry	NO ppm Dry	NO_2 ppm Wet	HC ppm Wet	O_2 % Dry	CO_2 % Dry	CO ppm Dry	NO ppm Dry	SO_2 ppm Dry	SO_3 ppm Dry	NOTES
01	6-3-79	48.2	PART OHIO COAL	10.2	6.7	OOS	291	0		9.7	7.3	OOS	253			
2	6-4-79	73.8	PART	10.6	8.1		304	0	107	10.8	7.9		267			
3	6-5-79		scratched	7.5	10.4		231	0	80	—	—		—			
4	6-6-79		scratched	9.1	9.0		258	0		7.6	10.1		171			
5	6-12-79	102.6	PART, Low O2 ↓	7.9	10.2		287	0		8.3	9.9		305			
6	6-13-79	98.6	PART KENT COAL	8.1	10.1		247	0		8.7	9.7		265			
7	6-14-79	84.9	OHIO COAL	8.7	9.6		276	0		9.2	9.3		288			
8	6-15-79	73.1	KENT COAL	9.0	9.4		203	0		9.2	9.6		222			
9	6-16-79	49.6	↓ ↓	12.2	7.0		306	OOS		11.5	7.5		261			
10	6-17-79		OFA TRAVERSE													
11	6-17-79															
12	6-17-79															
13	6-19-79	102.5	BRINK OHIO COAL	7.9	10.1		206			7.8	10.4		227			
14	6-20-79	97.1	PART, high O2 ↓	8.8	9.9		280			9.0	9.5		256			
15	6-28-79	93.9	SASS, SOx KENT COAL	7.9	9.9		236			8.2	9.8		231	1008	5	
16	6-30-79	92.6	SASS, SOx OHIO COAL	8.9	8.9		320			9.2	8.7		324	1468	11	

NOTE: All parts per million (ppm) figures are corrected to a 3% O_2 constant dilution factor

#15900

REV

KVB

GASEOUS EMISSIONS DATA

TEST SITE J

TEST NO 1

DATE 6-3-79

FUEL Ohio

LOAD 35,000

CONDITIONS as found

DATA TAKEN BY JOB

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO ppm(dry)		NO ppm(dry)		HOT LINE SAMPLES, PPM (WET)								REMARKS
								NOx		NO		NO_2		HC		
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	
Stack	155	10.3	7.4			155	262							550	929	? Hot Line HC
	2:15	10.3	7.0			150	253							560	946	Contaminated ?
Blr out.																
23·567	230															
		10.1	7.0			180	298							600	994	
23-567	245	10.3	6.0			170	287							580	979	
27-56	255	10.2	6.4			160	265							590	978	
2,3,5,6	305	10.0	7.3			190	312							580	952	
STACK	320	9.2	7.8			185	283							575	880	
STACK	350	9.1	6.8			140	212							620	941	

AVERAGES

				▨		▨		▨		▨		▨		▨		
BLR		10.2	6.7	▨		▨	291	▨		▨		▨		▨	976	HC contaminated
STACK		9.7	7.3	▨		▨	253	▨		▨		▨		▨	934	
				▨		▨		▨		▨		▨		▨		

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

KVB

GASEOUS EMISSIONS DATA

TEST SITE J

TEST NO 2

DATE 6-4-79

FUEL Oil

LOAD 50,000

CONDITIONS as found

DATA TAKEN BY MJ

RH = 44%

Probe Position	Time	O2 % (dry)	CO2 % (dry)	CO ppm(dry)		NO ppm(dry)		HOT LINE SAMPLES, PPM (WET) NOx		NO		NO2		HC		REMARKS
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	
Stack																Cal After Start
~~215~~	215	11.5	7.8			70	133.3							100	190.4	
	230	12.5	6.5			95	202.4							80	170.5	
	245	11.5	7.4			145	276.1							78	148.5	
Blr Out																
	250	11.0	7.8			160	281.3							78	1410	
	300	10.0	8.5			180	295.6							80	131.4	
	305	10.2	8.4			189	316.2	178	297.8	178	297.8	0		39	65.3	* Lower when No Sample
	310															ReCal Hot Line
	315	10.1	8.4			180	298.3	170	281.8	170	281.8	0		77	127.6	with HC
	325	10.2	8.4			180	301.1	170	284.4	170	284.4	0		30	50.2	*
	330	10.1	8.4			190	314.9							76	126.0	
Stack																
	340	10.0	8.4			180	295.6							77	126.5	
	345	10.1	8.4			185	306.6							78	129.3	
	355	10.7	7.9			180	315.9							80	140.4	
																ReCal
	310	11.3	7.5			150	279.7							78	145.4	
	315	10.7	8.0			170	298.3							76	133.4	
	325	9.2	9.0			190	290.7							65	99.4	
Blr Out																
	335	10.6	8.4			185	306.6							65	107.7	
	343	11.0	7.9			170	307.4	149	269.4	149	269.4	0		29	52.4	
	345	11.7	7.2			150	291.8							68	132.3	
	355	11.6	7.3			165	317.6							70	134.7	

AVERAGES

BLR		10.6	8.1	▨		▨	304	▨		▨		▨	0	▨	107	
STACK		10.8	7.9	▨		▨	261	▨		▨		▨		▨	157	

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

KVB

GASEOUS EMISSIONS DATA

TEST SITE J
TEST NO #3
DATE 6-5-79

FUEL Ohio
LOAD 70k
CONDITIONS
DATA TAKEN BY MJ

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO ppm(dry)		NO ppm(dry)		HOT LINE SAMPLES, PPM (WET)								REMARKS
								NOx		NO		NO_2		HC		
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	
Blront																
23567	10:10	8.2	9.8			180	253	~~190.6~~		~~190~~		~~.6~~		75	106	
		6.5	11.2					190.6		190		.6	.7	48	60	
	10:30	5.0	12.0			170	191							60	68	
	10:40	7.2	10.4			145	189							56	73	
	10:50	11.3	8.0			168	313							56	104	
	11:00	9.0	9.3			140	211	120		120			0	43/60	65/90	
	11:10	6.0	11.3			161	193							61	73	
	11:15	7.0	10.8			205	264							64	82	ReCal
Stack																
	11:20															
																TEST
																stopped
																due
																to
																smoke

AVERAGES

		7.5	10.4	▨		▨	231	▨		▨		▨	.4	▨	80	
				▨		▨		▨		▨		▨		▨		
				▨		▨		▨		▨		▨		▨		
				▨		▨		▨		▨		▨		▨		

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

KVB

GASEOUS EMISSIONS DATA

TEST SITE J

TEST NO 4

DATE 6-6-79

FUEL oil

LOAD 70K

CONDITIONS as is

DATA TAKEN BY MJ

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO ppm(dry)		NO ppm(dry)		HOT LINE SAMPLES, PPM (WET)								REMARKS
								NO_x		NO		NO_2		HC		
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	
Stack	905	8.0	9.5			125	173									
	915	7.1	10.6			130	169									
Blr Out	930	9.1	9.0			170	258									
																TEST
																scrubbed
																due
																to
																bad
																feed water
																regulator

AVERAGES

				▨		▨		▨		▨		▨		▨		
BLR		9.1	9.0	▨		▨	238	▨		▨		▨		▨		
STACK		7.6	10.1	▨		▨	171	▨		▨		▨		▨		
				▨		▨		▨		▨		▨		▨		

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

KVB

GASEOUS EMISSIONS DATA

TEST SITE J
TEST NO ~~#6~~ #5
DATE 6-12-79
FUEL Oil
LOAD 70 K
CONDITIONS
DATA TAKEN BY mJ

RH = 45%

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO ppm(dry)		NO ppm(dry)		HOT LINE SAMPLES, PPM (WET)								REMARKS
								NOx		NO		NO_2		HC		
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	
Blr Out																
23 567	330	7.9	10.2			190	261.6									
23567	345	8.2	9.9			170	239									
23 567	400	8.0	10.0			180	249.7									
Stack	415	8.5	9.9			208	290									
Stack	470	8 6	9.7			215	313									
Stack	445	8.7	9.4			210	308									
Stack	500	7.5	10.5			230	307									Re CaL
Blr Out																
23 56	515	7.9	10.2			250	344	220	303	220	303		0			
23 56	530	7.6	10.5			230	309	220	296	220	296		0			
23 56	545	7.5	10.5			240	321									

AVERAGES

BLR		7.9	10.2	▨		▨	287	▨		▨		▨	0	▨		
STACK		8.3	9.4	▨		▨	305	▨		▨		▨	0	▨		

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

KVB

GASEOUS EMISSIONS DATA

TEST SITE	J	FUEL	Kty.
TEST NO	# 6	LOAD	70,000
DATE	6-13-79	CONDITIONS	as found
		DATA TAKEN BY	MJ

RH = 36%

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO · ppm(dry)		NO ppm(dry)		HOT LINE SAMPLES, PPM (WET)								REMARKS
								NOx		NO		NO_2		HC		
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	
Blr Out																
2 3 5 6	1130	6.6	11.2			80	100									
2 3 5 6	1150	8.3	10.0			180	256									Cal.
2 3 5 6	1200	6.1	11.4			180	218	160	191	160	~~194~~		0			
Stack	1215	8.0	10.2			160	222									
	1230	10.5	8.5			180	310									
	1240	9.4	9.0			175	272									Cal Change Pts
	1250	8.2	10.0			185	261									
	1:00	7.2	10.7			199	260									
Blr out	110	7.0	10.9			190	245									
	120	9.5	9.1			180	283									
	130	9.5	9.0			180	283	180	283	180	283		0			
	150	9.7	8.8			165	264									
	200	7.9	10.2			185	255									
	205	8.0	10.3			195	271									
	215	8.0	10.2			210	291									

AVERAGES

BLR		8.1	10.1	▨		▨	247	▨		▨		▨	0	▨		
STACK		8.7	9.7	▨		▨	265	▨		▨		▨		▨		

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

KVB

GASEOUS EMISSIONS DATA

TEST SITE J
TEST NO # 7
DATE 6-14-77

FUEL Ohio
LOAD 65,000
CONDITIONS as found
DATA TAKEN BY MJ

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO ppm(dry)		NO ppm(dry)		HOT LINE SAMPLES, PPM (WET)								REMARKS
								NOx		NO		NO_2		HC		
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	
Blront																Cal. start
23567	11:15	9.0	9.4			160	241									
	11:25	9.4	9.0			180	280									Cal.
	1135	9.0	9.4			190	286	170	256	170	256	0	0			
	1140	8.8	9.5			195	288									
Stack	1150	9.0	9.4			190	286									
	1155	9.1	9.4			185	281									Changed sides
	1205	9.4	9.0			190	296									
Blront	1210	9.0	9.2			210	316									
2356	1220	7.8	10.2			200	273	162	221	162	221	0	0			
	1230	7.5	10.5			195	260									
	1245	8.5	9.7			190	274									
	1:00	9.5	8.9			183	284									
	1:10	8.0	10.2			185	257									

AVERAGES

				▨		▨		▨		▨		▨		▨		
Blr		8.7	9.6	▨		▨	276	▨		▨		▨	0	▨		
STACK		9.2	9.3	▨		▨	288	▨		▨		▨		▨		
				▨		▨		▨		▨		▨		▨		

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

KVB

GASEOUS EMISSIONS DATA

TEST SITE J

TEST NO #8

DATE 6-15-79

FUEL Kntucky

LOAD 50K

CONDITIONS [illegible] found

DATA TAKEN BY MJ

Probe Position	Time	O2 % (dry)	CO2 % (dry)	CO ppm(dry)		NO ppm(dry)		HOT LINE SAMPLES, PPM (WET) NOx		NO		NO2		HC		REMARKS
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	
Blr out																
23 56	1040	6.0	11.4			130										
	1050	5.5	12.0			126		90		90		0				Lost Load
																Stop Test
	1130	9.1	9.3			132	200									Start
	1145	9.0	9.4			134	202	97	146	97	146	0	0			
	1215	9.0	9.4			137	206									
Stack	1220	9.1	9.4			141	214									
	1235	9.1	9.6			142	215									
	1250	9.2	10.0			1[illegible]	224									
	1.00	9.2	9.4			150	229									

AVERAGES

				▨		▨		▨		▨		▨		▨		
BLR		9.0	9.4	▨		▨	203	▨		▨		▨	0	▨		
STACK		9.2	9.6	▨		▨	222	▨		▨		▨		▨		
				▨		▨		▨		▨		▨		▨		

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

KVB

GASEOUS EMISSIONS DATA

TEST SITE J

TEST NO 9

DATE 6-16-79

FUEL Kentucky

LOAD 35,000

CONDITIONS as found

DATA TAKEN BY MT

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO · ppm(dry)		NO ppm(dry)		HOT LINE SAMPLES, PPM (WET)								REMARKS
								NOx		NO		NO_2		HC		
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	
Stack	1040	11.2	7.8			130	240									
	1050	11.2	7.7			127	234									
	1105	11.5	7.4			129	246									
Blr out	11.15	11.9	7.0			135	268									Change sides - cal
23 56	1120	11.9	7.4			143	284									
	1130	12.0	7.1			143	288									
	1140	12.0	7.1			155	312									
	1155	11.6	7.4			145	279									
Stack																
	1200	11.6	7.6			150	289									
	1210	11.2	7.8			145	268									
	1220	11.9	7.2			149	284									
Blr out	1230	12.1	7.0			142	289									
2356	1250	12.5	6.6			155	330									
2356	115	13.0	6.4			158	358									

AVERAGES

				▨		▨		▨		▨		▨		▨		
Blr		12.2	7.0	▨		▨	306	▨		▨		▨		▨		
Stack		11.5	7.5	▨		▨	261	▨		▨		▨		▨		
				▨		▨		▨		▨		▨		▨		

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

KVB

GASEOUS EMISSIONS DATA

TEST SITE 1
TEST NO 13
DATE 6-14-79
FUEL Ohio Coal
LOAD ~70K lbs/hr
CONDITIONS as found
DATA TAKEN BY BD

Humidity 46 %

Probe Position	Time	O2 % (dry)	CO2 % (dry)	CO ppm(dry) unc	CO ppm(dry) cor	NO ppm(dry) unc	NO ppm(dry) cor	HOT LINE SAMPLES, PPM (WET) NOx unc	NOx cor	NO unc	NO cor	NO2 unc	NO2 cor	HC unc	HC cor	REMARKS
Stack	12:30	8.2	9.9			140	197									
Stack	12:40	8.0	9.7			155	215									
Stack	12:50	7.0	10.6			145	186									
Stack	1:00	7.5	10.7			155	207									
Stack	1:10	8.6	9.8			155	226									
Boiler	1:20	7.6	10.6			210	283									
Boiler	1:30	6.4	11.2			170	210									
Boiler	1:40	6.2	11.4			150	183									
Boiler	1:50	8.1	10.0			150	210									
Boiler	2:00	10.8	8.6			140	248									
																Dry 82°
																Wet 67°

AVERAGES

Stack		7.9	10.1	▨		▨	206	▨		▨		▨		▨		
Boiler Out		7.8	10.4	▨		▨	227	▨		▨		▨		▨		

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

KVB

GASEOUS EMISSIONS DATA

TEST SITE 1
TEST NO 14
DATE 6-20-79
FUEL [illegible]
LOAD [illegible]
CONDITIONS [illegible]
DATA TAKEN BY [illegible]

Probe Position	Time	O2 % (dry)	CO2 % (dry)	CO · ppm(dry)		NO ppm(dry)		HOT LINE SAMPLES, PPM (WET)								REMARKS
								NOx		NO		NO2		HC		
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	
BLR	1200	8.6	9.9			215	313									
	1230	9.6	9.7			176	256									[illegible] [illegible]
STACK	1300	9.3	9.5			135	285									
	1330	8.0	10.4			180	250									
	1400	8.5	9.9			225	325									
BLR	1430	9.2	9.7			215	329									
	1500	8.3	10.3			180	262									
STACK	1530	10.0	8.8			130	213									
	1600	9.1	9.4			135	205									
																RH = 72% Tdry - 80°F Twet - 73°F

AVERAGES

BLR		8.8	9.9	▨		▨	290	▨		▨		▨		▨		
STACK		9.0	9.5	▨		▨	256	▨		▨		▨		▨		

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

KVB

GASEOUS EMISSIONS DATA

TEST SITE J
TEST NO 15
DATE 6-28-79

FUEL Kentucky
LOAD 65,000 LB/HR
CONDITIONS ~8% O_2
DATA TAKEN BY JOB

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO ppm(dry)		NO ppm(dry)		HOT LINE SAMPLES, PPM (WET)								REMARKS
								NOx		NO		NO_2		HC		
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	
BLR	1215	8.5	9.6		045	140	202									
STACK	1300	8.2	9.8			148	209									
BLR	1400	8.8	8.5			180	266									Twet = 70F Tdry = 82°F
BLR	1340	7.0	10.6			170	219									RH = 56%
STACK	1430	8.1	9.7			190	252									
BLR	1530	7.2	10.6			178	233									
BLR	1600	7.2	10.6			165	216									
BLR	1630	8.7	9.5			170	249									
BLR	1700	7.8	10.0			175	239									
BLR	1720	8.3	9.5			188	263									

AVERAGES

BLR		7.9	9.9	▨		▨	236	▨		▨		▨		▨		
				▨		▨		▨		▨		▨		▨		
STACK		8.2	9.8	▨		▨	231	▨		▨		▨		▨		
				▨		▨		▨		▨		▨		▨		

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

KVB

GASEOUS EMISSIONS DATA

TEST SITE J
TEST NO 16
DATE 6-30-79

FUEL Ohio
LOAD 70,000 LB/HR
CONDITIONS ~8% O_2 as found
DATA TAKEN BY JOB

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO · ppm(dry) unc	CO · ppm(dry) cor	NO ppm(dry) unc	NO ppm(dry) cor	HOT LINE SAMPLES, PPM (WET) NOx unc	NOx cor	NO unc	NO cor	NO_2 unc	NO_2 cor	HC unc	HC cor	REMARKS
BLR	1200	7.4	9.8		005	180	239									
STACK	1245	8.5	9.2			180	260									Twet = 68°F
																Tdry = 75°F
BLR	1330	9.5	8.7			235	369									RH = 70%
BLR	1400	9.3	8.8			202	312									
BLR	1440	8.5	7.2			200	289									
BLR	1530	9.7	8.2			245	391									
STACK	1600	9.8	8.2			240	387									

AVERAGES

BLR		8.9	8.9	▨		▨	320	▨		▨		▨		▨		
STACK		9.2	8.7	▨		▨	324	▨		▨		▨		▨		

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

local

SOx DATA SHEET

Date

Probe Location & Probe Length 3' - NW PORT

Unit #

Fuel KENTUCKY

Load

Test Description:

Test No.	Box No.	Sample Time	Meter Temp.(T)	(p) Meter Press.	Meter Reading	(P) Baro. Press.	Port	Purge Time	O2
[illegible]	[illegible]	15:40	57	- 0 -	0.000	29.71	Stack NW	20.0	
		15:54	94		1.000				
[illegible]	1	16:20	93		0.000			16:35	
		16:34	90		1.000			20.0	
[illegible]		17:00	88		0.000			17:13	
		17:12	86		1.000			20.0	

*

SAMPLED BY

Test # 15A Test # 15B Test # 15C

	SO2	SO3	SOx	SO2	SO3	SOx	SO2	SO3	SOx
Normality N	.0108								
Dilution Factor F	25	1		20	1		20	1	
Blank B									
Averages									
Ml. of Titrant A	5.4 5.3 5.3	.9		8.5 8.5 8.6	.6		7.2 7.2 7.3	.8	
Averages	5.3			8.5	.6		7.2	.8	
460 + T									
Sample Vol. V									
P + p									
A - B									

TITRATED BY RAP

$$SO2 = \frac{(A-B)(N)(F)(460+T)(24)}{V(P+p)}$$

$$SO2 = \frac{(5.3)(.0108)(25)(553.5)24}{(1.000)(29.71)}$$

SO2 = $\boxed{641.5}$ SO3 = $\boxed{41.1}$

$$SO3 = \frac{(\ \ )(\ \ )(\ \ )(\ \ )24}{(\ \ )(\ \ )}$$

SO2 @ 3% O2 = 704.2

SO3 @ 3% O2 = [illegible]

SOx @ 3% O2 = [illegible]

* contaminated

$$SO2 = \frac{(8.5)(.0108)(20)(551.5)24}{(\ \ )(\ \ )}$$

SO2 = $\boxed{817}$

$$SO3 = \frac{(\ \ )(\ \ )(\ \ )(\ \ )24}{(\ \ )(\ \ )}$$

SO3 = $\boxed{2.55}$

SO2 @ 3% O2 = 1151.5

SO3 @ 3% O2 = [illegible]

SOx @ 3% O2 = [illegible]

$$SO2 = \frac{(7.2)(.0108)(20)(547)24}{(\ \ )(\ \ )}$$

SO2 = $\boxed{686.5}$

$$SO3 = \frac{(\ \ )(\ \ )(\ \ )(\ \ )24}{(\ \ )(\ \ )}$$

SO3 = $\boxed{55}$

SO2 @ 3% O2 = [illegible]

SO3 @ 3% O2 = [illegible]

SOx @ 3% O2 = [illegible]

Local Site J

SOx DATA SHEET

Date 6-30-79 Probe Location & Probe Length 3' — NW PORT STACK

Unit # 4 Fuel OHIO Load

Test Description:

Test No.	Box No.	Sample Time	Meter Temp.(T)	(p) Meter Press.	Meter Reading	(P) Baro. Press.	Port	Purge Time	O2
16A	3	13:32	64°	-0-	0.000	29.26	NW	13:51	
		13:47	64	↓	1.200			14:11	
16B	1	14:18	63		0.000	↓	↓	14:37	
		14.34	63		1.200			14:57	
16C	1	15:10	62		0.000			15:25	
		15:25	62	↓	1.200	↓	↓	15:50	

SAMPLED BY R.AP

Test # 16A Test # 16B Test # 16C

	SO2	SO3	SOx	SO2	SO3	SOx	SO2	SO3	SOx
Normality N	.0108	→							
Dilution Factor F	20	1		20	1		20	1	
Blank B	—								
Averages									
Ml. of Titrant A	11.7 11.8 11.8	1.9		11.2 11.3 11.2	1.8		14.3 14.3 14.2	2.2	
Averages	11.8	1.9		11.2	1.8		14.3	2.2	
460 + T	524	→		523	→		522		
Sample Vol. V	1.200	→		1.200	→		1.200	→	
P + p	29.26	→		29.26	→		29.26	→	
A - B	11.8	1.9		11.2	1.8		14.3	2.2	

TITRATED BY R.AP

$$SO2 = \frac{(A-B)(N)(F)(460+T)(24)}{V(P+p)}$$

$$SO2 = \frac{(\ \ )(\ \ )(\ \ )(\ \ )24}{(\ \ )(\ \ )}$$

SO2 = 913 SO3 = 7.3

$$SO3 = \frac{(\ \ )(\ \ )(\ \ )(\ \ )24}{(\ \ )(\ \ )}$$

SO2 @ 3% O2 = 1398
SO3 @ 3% O2 = 11.2
SOx @ 3% O2 = 1408

$$SO2 = \frac{(\ \ )(\ \ )(\ \ )(\ \ )24}{(\ \ )(\ \ )}$$

SO2 = 864

$$SO3 = \frac{(\ \ )(\ \ )(\ \ )(\ \ )24}{(\ \ )(\ \ )}$$

SO3 = 6.9

SO2 @ 3% O2 = 1321.8
SO3 @ 3% O2 = 10.6
SOx @ 3% O2 = 1333

$$SO2 = \frac{(\ \ )(\ \ )(\ \ )(\ \ )24}{(\ \ )(\ \ )}$$

SO2 = 1102

$$SO3 = \frac{(\ \ )(\ \ )(\ \ )(\ \ )24}{(\ \ )(\ \ )}$$

SO3 = 8.4

SO2 @ 3% O2 = 1686
SO3 @ 3% O2 = 12.9
SOx @ 3% O2 = 1699

SECTION 4.0

PARTICLE SIZE DISTRIBUTION

PAGE

4.1 BRINK 84

4.2 SASS 90

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BRINK CASCADE IMPACTOR DATA SHEET

TEST NO. 13
LOAD 70,000 LB/HR
TEST SITE T
% O_2 7.8 %
TEST DATE 6-19-79
FUEL Ohio
SAMPLE LOCATION BLR OUT
SPECIAL CONDITIONS as found

GAS VELOCITY DETERMINATION

PITOT TUBE ΔP .65
BAROMETRIC PRESS in. Hg, P_{bar} 29.87
GAS TEMP. °R, Ts 480 94°
GAS STATIC PRESS in. H_2O -1.7" H_2O
PITOT CORRECTION FACTOR, Cp .86
GAS STATIC PRESS in. Hg abs, Ps 29.74
MOLECULAR WT. FLUE GAS, MW_s 29.4

$$Vs = 85.48\ Cp \left(\frac{Ts\ \Delta P}{Ps\ MWs}\right)^{1/2} = \underline{61.45}\ \text{ft/sec}$$

IMPACTOR FLOW RATE DETERMINATION

NOZZLE DIAMETER inches, Dn .059
NOZZLE AREA ft^2, An 1.902×10^{-5} $An = \pi (Dn/24)^2$

$Qs = Vs\ An\ 60 = \underline{.070}$ ft^3/min at nozzle

$Qc = Qs \left(\frac{PsMWs}{1.3Ts}\right)^{1/2} = \underline{.059}$ ft^3/min corrected to calibration conditions

PRESSURE DROP ACROSS IMPACTOR FROM CALIBRATION CURVE 16.5 in. H_2O

OPERATING VACUUM (corrected for static pressure of duct) 18.2 in. H_2O

ISOKINETICS DETERMINATION

	SAMPLE TIME (θ)	METER READING (Vm)	METER TEMP (Tm)
INITIAL	000 →	→	80
FINAL	[illegible]	[illegible]	[illegible]
Δ			

% H_2O = 6.0 %

$$I = \frac{1.667\ Ts\ Vm\ P_{bar}}{\theta\ Tm\ Vs\ Ps\ An(1-\frac{\%H_2O}{100})} = \underline{\qquad}\ \%$$

KVB

BRINK CASCADE IMPACTOR LAB WORKSHEET

TEST No. 13
LOCATION Site J – BLR OUT #4
TEST DATE 6-19-79
ENGINEER
TEST DESCRIPTION

SET #1

PRE TEST WEIGHTS (GRAMS)

PLATE NO.		CYCLONE	1	2	3	4	5	FINAL FILTER
DATE WT.								
TARE WT.	1	.1136	3.5085	3.0907	3.9792	3.7788	3.9004	.0370
	2	.1137	3.5085	3.0907	3.9791	3.7788	3.9005	.0380
	3	—	—	—	—	—	—	—
	4	—	—	—	—	—	—	—
AVERAGE		.1136	3.5085	3.0907	3.9791	3.7788	3.9004	.0379

POST TEST WEIGHTS (GRAMS)

DATE WT.								
GROSS WT.	1	.1266	3.5106	3.0922	3.9803	3.7799	3.9013	.0380
	2	.1268	3.5107	3.0922	3.9805	3.7799	3.9012	.0383
	3	—	3.5105	3.0921	3.9805	3.7798	3.9012	.0384
	4	—	—	—	—	—	—	—
AVERAGE		.1267	3.5106	3.0922	3.9804	3.7799	3.9012	.0382

NET TEST RESULTS (MILLIGRAMS)

NET WT.	0.0131	0.0021	0.0015	0.0013	0.0011	0.0008	0.0003
PERCENT	64.9	10.4	7.4	6.4	5.4	4.0	1.5

TOTAL NET WEIGHT 20.2 mgm

KVB

BRINK CASCADE IMPACTOR DATA REDUCTION

TEST NO. 13
TEST SITE J
TEST DATE 6-19-79
SAMPLE LOCATION BLR-OUT

LOAD 70,000 LB/HR
% O_2 7.8 %
FUEL Ohio
SPECIAL CONDITIONS as found

ρp - Density of particles 2.5 g/cm^3
μ - Viscosity of flue gas 2.59×10^{-4} poise
MWs - Molecular wt. flue gas 29.04 g/g mole
ΔP_I - Pressure drop across impactor 16.5 in H_2O
Ps - Absolute stack pressure 29.74 in. Hg
Ts - Absolute stack temperature 940 °R
Qs - Actual flow rate at stack conditions 0.070 ft^3/min

Vm - Dry gas volume ________ SCF
Mn - Total particulate mass ________ mgm
Cn - Total concentration ________ grains/SCF
I - Percent isokinetics ________ %
Vs - Gas velocity ________ ft/sec.
Dn - Nozzle diameter ________ in.

Stage Number	CYCLONE	1	2	3	4	5	FINAL FILTER
Dj - Jet Diameter, cm		0.2490	0.1775	0.1396	0.0946	0.0731	
Fj - Press. factor, n.d.		0.0210	0.0273	0.0395	0.0903	0.3277	
$D_{s,\overline{50}}$ Stokes diameter, μm		2.95	1.70	1.13	0.55	0.32	
$D_{A,\overline{50}}$ Aerodynamic diameter, μm		4.78	2.80	1.90	0.97	0.60	
$D_{AI,\overline{50}}$ Aerodynamic impaction diameter, μm		4.98	3.00	2.09	1.16	0.787	
Mn - Particulate mass, mgm	13.1	2.1	1.5	1.3	1.1	0.8	0.3
% - Percent of Total	64.9	10.4	7.4	6.4	5.4	4.0	1.5
Cumulative percent	35.1	24.7	17.3	10.9	5.5	1.5	0
Cn - Concentration, grains/SCF							
Cumulative concentration, grains/SCF							

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BRINK CASCADE IMPACTOR DATA SHEET

TEST NO. 13

LOAD 70,000 lB/HR

TEST SITE J

% O_2 7.8%

TEST DATE 6-19-79

FUEL OHio

SAMPLE LOCATION STACK

SPECIAL CONDITIONS simultaneous Brink

GAS VELOCITY DETERMINATION

PITOT TUBE ΔP .17

BAROMETRIC PRESS in. Hg, P_{bar} 29.87

GAS TEMP. °R, Ts 345

GAS STATIC PRESS in. H_2O —

PITOT CORRECTION FACTOR, Cp .86

GAS STATIC PRESS in. Hg abs., Ps —

MOLECULAR WT. FLUE GAS, MW_s 29.4

$$Vs = 85.48\ Cp \left(\frac{Ts\ \Delta P}{Ps\ MWs}\right)^{1/2} = 29.02 \text{ ft/sec}$$

IMPACTOR FLOW RATE DETERMINATION

NOZZLE DIAMETER inches, Dn .071

NOZZLE AREA ft^2, An 2.749×10^{-5}

$An = \pi(Dn/24)^2$

$Qn = Vs\ An\ 60 = .047$ ft^3/min at nozzle

$Qc = Qs \left(\frac{PsMWs}{1.3Ts}\right)^{1/2} = .043$ ft^3/min corrected to calibration conditions

PRESSURE DROP ACROSS IMPACTOR FROM CALIBRATION CURVE 9.0 in. H_2O

OPERATING VACUUM (corrected for static pressure of duct) 9.0 in. H_2O

ISOKINETICS DETERMINATION

	SAMPLE TIME (θ)	METER READING (Vm)	METER TEMP (Tm)
INITIAL		0.000	86
FINAL	45.0'	1.275	87
Δ			

$\%H_2O$ = 6.0 %

$$I = \frac{1.667\ Ts\ Vm\ P_{bar}}{\theta\ Tm\ Vs\ Ps\ An(1-\frac{\%H_2O}{100})} = \underline{\qquad}\ \%$$

KVB

BRINK CASCADE IMPACTOR LAB WORKSHEET

TEST No. 13

LOCATION Site J – MECH #4

TEST DATE 6-19-79

ENGINEER

TEST DESCRIPTION

SET #2

PRE TEST WEIGHTS (GRAMS)

PLATE NO.		CYCLONE	1	2	3	4	5	FINAL FILTER
DATE WT.								
TARE WT.	1		~~3.4130~~	~~3.2716~~	~~3.4971~~	~~3.4646~~	~~3.3018~~	~~.0384~~
	2		3.4124	3.2709	3.4966	3.4639	3.3012	.0378
	3		3.4128	3.2710	3.4966	3.4639	3.3012	.0377
	4	—	—	—	—	—	—	—
AVERAGE			3.4126	3.2709	3.4966	3.4639	3.3012	.0377

POST TEST WEIGHTS (GRAMS)

DATE WT.								
GROSS WT.	1		3.4132	3.2719	3.4972	3.4650	3.3019	.0381
	2		3.4132	3.2719	3.4970	3.4649	3.3020	.0380
	3		3.4131	3.2720	3.4972	3.4651	3.3021	.0382
	4		—	—	—	—	—	—
AVERAGE			3.4132	3.2719	3.4971	3.4650	3.3020	.0381

NET TEST RESULTS (MILLIGRAMS)

NET WT.	—	0.0006	0.0010	0.0005	0.0011	0.0008	0.0004
PERCENT	—	13.6	22.7	11.4	25.0	18.2	9.1

TOTAL NET WEIGHT 4.4 mgm

KVB

BRINK CASCADE IMPACTOR DATA REDUCTION

TEST NO. 13
TEST SITE J
TEST DATE 6-19-79
SAMPLE LOCATION STACK

LOAD 70,000 LB/HR
% O_2 7.9%
FUEL Ohio Coal
SPECIAL CONDITIONS As found

ρp - Density of particles 2.5 g/cm^3
μ - Viscosity of flue gas 2.32×10^{-4} poise
MWs - Molecular wt. flue gas 29.04 g/g mole
ΔP_I - Pressure drop across impactor 9.0 in H_2O
Ps - Absolute stack pressure 29.87 in. Hg
Ts - Absolute stack temperature 805 °R
Qs - Actual flow rate at stack conditions 0.047 ft^3/min

Vm - Dry gas volume ________ SCF
Mn - Total particulate mass ________ mgm
Cn - Total concentration ________ grains/SCF
I - Percent isokinetics ________ %
Vs - Gas velocity ________ ft/sec.
Dn - Nozzle diameter ________ in.

Stage Number	CYCLONE	1	2	3	4	5	FINAL FILTER
Dj - Jet Diameter, cm		0.2490	0.1775	0.1396	0.0946	0.0731	
Fj - Press. factor, n.d.		0.0210	0.0273	0.0395	0.0903	0.3277	
$D_{S,\overline{50}}$ Stokes diameter, µm		3.49	2.04	1.38	0.71	0.43	
$D_{A,\overline{50}}$ Aerodynamic diameter, µm		5.60	3.31	2.26	1.20	0.77	
$D_{AI,\overline{50}}$ Aerodynamic impaction diameter, µm		5.75	3.46	2.41	1.35	0.912	
Mn - Particulate mass, mgm	0	0.6	1.0	0.5	1.1	0.8	0.4
% - Percent of Total	0	13.6	22.7	11.4	25.0	18.2	9.1
Cumulative percent	100.0	86.4	63.7	52.3	27.3	9.1	0
Cn - Concentration, grains/SCF							
Cumulative concentration, grains/SCF							

SITE J

SASS GRAVIMETRICS

Test	Fraction		%	% Passing
Test 15				
	10μ	0.4739	24.77	75.23
	3μ	0.1265	6.61	68.62
	1μ	0.1979	10.35	58.27
	Filters	0.6897	58.27	0
		0.4249		
	Total	1.9129	100.00	
Test 16	10μ	0.2905	19.06	80.94
	3μ	None	-	80.94
	1μ	0.2358	15.47	65.47
	Filter	0.9975	65.46	0
	Total	1.5238	99.99	

SECTION 5.0

FUEL AND ASH ANALYSIS

PAGE

5.1 COMMERCIAL TESTING ANALYSIS 92

5.2 COMBUSTIBLE ANALYSIS 117

5.3 COAL SIEVE ANALYSIS 118

F-462

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COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

SINCE 1908

PLEASE ADDRESS ALL CORRESPONDENCE TO:
16130 VAN DRUNEN RD., SOUTH HOLLAND, IL 60473
OFFICE TEL. (312) 264-1173

KVB
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

June 28, 1979

Sample identification
by KVB

Test No. 1
Sample: Ohio Coal
Test Site: J

Kind of sample reported to us	Coal
Sample taken at	----
Sample taken by	KVB
Date sampled	----
Date received	6/23/79

Analysis report no. 71-34526

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	2.89	xxxxx
% Ash	6.31	6.50
% Volatile	37.43	38.54
% Fixed Carbon	53.37	54.96
	100.00	100.00
Btu/lb.	13572	13976
% Sulfur	1.06	1.09

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxxx °F	xxxx °F
Softening (H=W)	xxxx °F	xxxx °F
Softening (H=½W)	xxxx °F	xxxx °F
Fluid	xxxx °F	xxxx °F

H — Cone Height
W — Cone Width

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

LAHouser

R. A. HOUSER, Manager, Midwest Division

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SINCE 1908

KVB
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

June 28, 1979

Sample identification
by KVB

Test No. 2
Sample: Ohio Coal
Test Site: J

Kind of sample reported to us	Coal
Sample taken at	----
Sample taken by	KVB
Date sampled	----
Date received	6/23/79

Analysis report no. 71-34530

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	3.12	xxxxx
% Ash	7.06	7.29
% Volatile	37.62	38.83
% Fixed Carbon	52.20	53.88
	100.00	100.00
Btu/lb.	13405	13837
% Sulfur	1.52	1.57

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxxx °F	xxxx °F
Softening (H = W)	xxxx °F	xxxx °F
Softening (H = ½W)	xxxx °F	xxxx °F
Fluid	xxxx °F	xxxx °F

H = Cone Height
W = Cone Width

Respectfully submitted,
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KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

July 17, 1979

Sample identification
by KVB, Inc.

Test No. 5

Kind of sample reported to us	Ohio Coal
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/12/79
Date received	7/12/79

Analysis report no. 71- 35626

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	4.44	xxxxx
% Ash	10.22	10.69
% Volatile	37.19	38.92
% Fixed Carbon	48.15	50.39
	100.00	100.00
Btu/lb.	12570	13154
% Sulfur	2.18	2.28

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxx °F	xxx °F
Softening (H=W)	xxx °F	xxx °F
Softening (H=½W)	xxx °F	xxx °F
Fluid	xxx °F	xxx °F

H = Cone Height
W = Cone Width

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division

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KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

July 17, 1979

Sample identification
by KVB, Inc.

Test No. 6

Kind of sample reported to us	Kentucky Coal
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/13/79
Date received	7/12/79

Analysis report no. 71- 35632

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	2.02	xxxxx
% Ash	4.18	4.27
% Volatile	40.58	41.42
% Fixed Carbon	53.22	54.31
	100.00	100.00
Btu/lb.	13966	14254
% Sulfur	1.30	1.33

FUSION TEMPERATURE OF ASH

	Reducing		Oxidizing	
Initial Deformation	xxx	°F	xxx	°F
Softening (H=W)	xxx	°F	xxx	°F
Softening (H=½W)	xxx	°F	xxx	°F
Fluid	xxx	°F	xxx	°F

H = Cone Height
W = Cone Width

Respectfully submitted,
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KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

July 17, 1979

Sample identification
by KVB, Inc.

Test No. 7

Kind of sample reported to us	Ohio Coal
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/14/79
Date received	7/12/79

Analysis report no. 71- 35630

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	2.93	xxxxx
% Ash	7.11	7.32
% Volatile	38.89	40.06
% Fixed Carbon	51.07	52.62
	100.00	100.00
Btu/lb.	13373	13777
% Sulfur	1.68	1.73

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxx °F	xxx °F
Softening (H = W)	xxx °F	xxx °F
Softening (H = ½W)	xxx °F	xxx °F
Fluid	xx °F	xxx °F

H = Cone Height
W = Cone Width

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division

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OFFICE TEL. (312) 264-1173

CTE
SINCE 1908

July 17, 1979

KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

Sample identification by KVB, Inc.

Test No. 8

Kind of sample reported to us	Kentucky Coal
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/15/79
Date received	7/12/79

Analysis report no. 71- 35628

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	1.94	xxxxx
% Ash	5.31	5.42
% Volatile	40.35	41.15
% Fixed Carbon	52.40	53.43
	100.00	100.00
Btu/lb.	13995	14272
% Sulfur	1.40	1.43

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxx °F	xxx °F
Softening (H = W)	xxx °F	xxx °F
Softening (H = ½W)	xxx °F	xxx °F
Fluid	xxx °F	xxx °F

H — Cone Height
W — Cone Width

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R. A. HOUSER, Manager, Midwest Division

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KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

July 17, 1979

Sample identification
by KVB, Inc.

Test No. 9

Kind of sample reported to us	Kentucky Coal
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/16/79
Date received	7/12/79

Analysis report no. 71- 35629

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	2.91	xxxxx
% Ash	11.76	12.11
% Volatile	35.85	36.92
% Fixed Carbon	49.48	50.97
	100.00	100.00
Btu/lb.	12511	12886
% Sulfur	2.57	2.65

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxx °F	xxx °F
Softening (H = W)	xxx °F	xxx °F
Softening (H = ½W)	xxx °F	xxx °F
Fluid	xxx °F	xxx °F

H = Cone Height
W = Cone Width

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division

Charter Member

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PLEASE ADDRESS ALL CORRESPONDENCE TO:
16130 VAN DRUNEN RD., SOUTH HOLLAND, IL 60473
OFFICE TEL. (312) 264-1173

SINCE 1908

KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

July 17, 1979

Sample identification
by KVB, Inc.

Test No. 13

Kind of sample reported to us	Ohio Coal
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/19/79
Date received	7/12/79

Analysis report no. 71- 35631

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	4.85	xxxxx
% Ash	8.23	8.65
% Volatile	36.71	38.58
% Fixed Carbon	50.21	52.77
	100.00	100.00
Btu/lb.	12810	13463
% Sulfur	1.64	1.72

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxx °F	xxx °F
Softening (H = W)	xxx °F	xxx °F
Softening (H = ½W)	xxx °F	xxx °F
Fluid	xxx °F	xxx °F

H — Cone Height
W — Cone Width

Respectfully submitted,
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OFFICE TEL. (312) 264-1173

SINCE 1908

KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

July 17, 1979

Sample identification
by KVB, Inc.

Test No. 14

Kind of sample reported to us	Ohio Coal
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/20/79
Date received	7/12/79

Analysis report no. 71- 35625

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	3.18	xxxxx
% Ash	8.23	8.50
% Volatile	38.91	40.19
% Fixed Carbon	49.68	51.31
	100.00	100.00
Btu/lb.	13101	13531
% Sulfur	1.82	1.88

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxx °F	xxx °F
Softening (H = W)	xxx °F	xxx °F
Softening (H = ½W)	xxx °F	xxx °F
Fluid	x..x °F	xxx °F

H = Cone Height
W = Cone Width

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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OFFICE TEL. (312) 264-1173

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KVB
A Research-Cottrell Co.
6176 Olson Memorial Highway
Minneapolis, MN 55422

July 25, 1979

Sample identification
by KVB

Test #15
Test Site: J

Kind of sample reported to us	Kent. Coal
Sample taken at	----
Sample taken by	KVB
Date sampled	6/28/79
Date received	7/12/79

Analysis report no. 71-35627

PROXIMATE ANALYSIS

	As Received	Dry Basis
%Moisture..............	2.09	xxxxx
%Ash...................	5.02	5.13
%Volatile..............	39.58	40.42
%Fixed Carbon..........	53.31	54.45
	100.00	100.00
Btu/lb.................	13954	14252
%Sulfur................	1.03	1.05

SULFUR FORMS	%Weight As Received	%Weight Dry Basis
%Pyritic Sulfur........	0.26	0.27
%Sulfate Sulfur........	0.02	0.02
%Organic Sulfur(dif)...	0.75	0.76

Respectfully submitted,
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KVB
A Research-Cottrell Co.
6176 Olson Memorial Highway
Minneapolis, MN 55422

July 21, 1979

Sample identification by KVB

Kind of sample reported to us	Coal
Sample taken at	----
Sample taken by	KVB
Date sampled	6/30/79
Date received	7/12/79

Sample: Ohio coal
Test No. 16
Test site: J

Analysis report no. 71-35633

PROXIMATE ANALYSIS

	As Received	Dry Basis
%Moisture	3.73	xxxxx
%Ash	7.77	8.07
%Volatile	38.06	39.53
%Fixed carbon	50.44	52.40
	100.00	100.00
Btu/lb.	12990	13493
%Sulfur	2.02	2.10
%Pyritic sulfur	1.39	1.44
%Sulfate sulfur	0.10	0.11
%Organic sulfur	0.53	0.55

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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KVB
A Research-Cottrell Co.
6176 Olson Memorial Highway
Minneapolis, MN 55422

July 25, 1979

Sample identification by KVB

Kind of sample reported to us: Ohio Coal

Sample taken at: ——

Sample taken by: KVB

Date sampled: ——

Date received: 7/12/79

Test No.: Composite
Test Site: J

Analysis report no. 71-35635

PROXIMATE ANALYSIS	As received	Dry basis
% Moisture	3.05	xxxxx
% Ash	7.05	7.27
% Volatile	37.93	39.12
% Fixed Carbon	51.97	53.61
	100.00	100.00
Btu/lb.	13368	13789
% Sulfur	1.75	1.80
% Alk. as Na_2O	xxxxx	0.12
SULFUR FORMS		
% Pyritic Sulfur	0.97	1.00
% Sulfate Sulfur	0.05	0.05
% Organic Sulfur	0.73	0.75
WATER SOLUBLE ALKALIES		
% Na_2O =	xxxxx	xxxxx
% K_2O =	xxxxx	xxxxx

FUSION TEMPERATURE OF ASH	Reducing	Oxidizing
Initial Deformation	2100 °F	xxxxx °F
Softening (H = W)	2250 °F	xxxxx °F
Softening (H = ½W)	2400 °F	xxxxx °F
Fluid	2535 °F	xxxxx °F

H is Cone Height
W is Cone Width

% EQUILIBRIUM MOISTURE = 2.94
HARDGROVE GRINDABILITY INDEX = 53
FREE SWELLING INDEX = 4

ULTIMATE ANALYSIS	% Weight As received	% Weight Dry basis
Moisture	3.05	xxxxx
Carbon	74.74	77.09
Hydrogen	5.13	5.29
Nitrogen	1.66	1.71
Chlorine	0.19	0.20
Sulfur	1.75	1.80
Ash	7.05	7.27
Oxygen (diff)	6.43	6.64
	100.00	100.00

MINERAL ANALYSIS OF ASH	% Weight Ignited Basis
Silica, SiO_2	42.48
Alumina, Al_2O_3	26.60
Titania, TiO_2	1.29
Ferric oxide, Fe_2O_3	22.09
Lime, CaO	2.11
Magnesia, MgO	0.83
Potassium oxide, K_2O	1.91
Sodium oxide, Na_2O	0.35
Sulfur trioxide, SO_3	1.43
Phos. pentoxide, P_2O_5	0.40
Undetermined	0.38*
	100.00
SILICA VALUE =	62.92
BASE: ACID RATIO	0.39
T_{250} Temperature =	2425°F

*These ignited basis results were used to calculate undetermined value above

%Strontium oxide, SrO 0.00
%Barium oxide, BaO 0.08
%Manganese oxide, Mn_3O_4 .... 0.05

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division

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OFFICE TEL. (312) 264-1173

SINCE 1908

KVB
A Research-Cottrell Co.
6176 Olson Memorial Highway
Minneapolis, MN 55422

July 26, 1979

Kind of sample reported to us: Coal

Sample taken at: ——

Sample taken by: KVB

Date sampled: ——

Date received: 7/12/79

Sample identification by: KVB

Test No. Composite
Sample: Kent Coal
Test Site: J

Analysis report no. 71-35634

PROXIMATE ANALYSIS	As received	Dry basis
% Moisture	1.96	xxxxx
% Ash	6.14	6.26
% Volatile	39.08	39.86
% Fixed Carbon	52.82	53.88
	100.00	100.00
Btu/lb.	13624	13897
% Sulfur	1.43	1.46
% Alk. as Na_2O	xxxxx	0.12

ULTIMATE ANALYSIS	% Weight As received	% Weight Dry basis
Moisture	1.96	xxxxx
Carbon	76.77	78.31
Hydrogen	5.09	5.19
Nitrogen	1.23	1.25
Chlorine	0.13	0.13
Sulfur	1.43	1.46
Ash	6.14	6.26
Oxygen (diff)	7.25	7.40
	100.00	100.00

SULFUR FORMS	As received	Dry basis
% Pyritic Sulfur	0.68	0.69
% Sulfate Sulfur	0.02	0.02
% Organic Sulfur	0.73	0.75

WATER SOLUBLE ALKALIES	As received	Dry basis
% Na_2O =	xxxxx	xxxxx
% K_2O =	xxxxx	xxxxx

FUSION TEMPERATURE OF ASH	Reducing	Oxidizing
Initial Deformation	2205 °F	°F
Softening (H = W)	2335 °F	°F
Softening (H = ½W)	2465 °F	°F
Fluid	2580 °F	°F

H is Cone Height
W is Cone Width

% EQUILIBRIUM MOISTURE = 2.07
HARDGROVE GRINDABILITY INDEX = 49
FREE SWELLING INDEX = 6

MINERAL ANALYSIS OF ASH	% Weight Ignited Basis
Silica, SiO_2	44.08
Alumina, Al_2O_3	26.46
Titania, TiO_2	1.51
Ferric oxide, Fe_2O_3	17.80
Lime, CaO	2.28
Magnesia, MgO	0.78
Potassium oxide, K_2O	1.78
Sodium oxide, Na_2O	0.80
Sulfur trioxide, SO_3	1.85
Phos. pentoxide, P_2O_5	0.31
Undetermined	1.89
	100.00
SILICA VALUE =	67.88
BASE: ACID RATIO	0.33
T_{250} Temperature =	2515°F

*These ignited basis results were us
to calculate undetermined value above

%Strontium oxide, SrO	0.14
%Barium oxide, BaO	0.30
%Manganese oxide, Mn_3O_4	0.02
Fouling index	0.26
Slagging index	0.48

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

R. A. HOUSER, Manager, Midwest Division

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OFFICE TEL. (312) 264-1173

SINCE 1908

KVB
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

June 28, 1979

Sample identification
by KVB

Test No. 1
Sample: Bottom Ash
Site: J

Kind of sample reported to us	Ash
Sample taken at	----
Sample taken by	KVB
Date sampled	----
Date received	6/23/79

Analysis report no. 71-34527

	Dry Basis
%Ash.........................	79.83
%Combustible.................	20.17

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division

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OFFICE TEL. (312) 264-1173

June 28, 1979

KVB
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

Sample identification
by KVB

Test No. 2
Sample: Bottom Ash
Site: J

Kind of sample reported to us	Ash
Sample taken at	----
Sample taken by	KVB
Date sampled	----
Date received	6/23/79

Analysis report no. 71-34531

	Dry Basis
%Ash.........................	84.53
%Combustible.................	15.47

Respectfully submitted,
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R. A. HOUSER, Manager, Midwest Division

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OFFICE TEL. (312) 264-1173

July 17, 1979

KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

Sample identification
by KVB, Inc.

Test No. 6

Kind of sample reported to us	Bottom Ash
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/13/79
Date received	7/12/79

Analysis report no. 71- 35638

% Combustible, dry basis 20.26

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.
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R. A. HOUSER, Manager, Midwest Division

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KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

July 17, 1979

Sample identification
by KVB, Inc.

Test No. 7

Kind of sample reported to us	Bottom Ash
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/14/79
Date received	7/12/79

Analysis report no. 71- 35641

% Combustible, dry basis 19.57

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

R A Houser

R. A. HOUSER, Manager, Midwest Division

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KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

July 17, 1979

Sample Identification
by KVB, Inc.

Test No. 8

Kind of sample reported to us	Bottom Ash
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/15/79
Date received	7/12/79

Analysis report no. 71- 35640

% Combustible, dry basis 30.75

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division

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July 17, 1979

KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

Sample identification
by KVB, Inc.

Test No. 9

Kind of sample reported to us	Bottom Ash
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/16/79
Date received	7/12/79

Analysis report no. 71- 35637

% Combustible, dry basis 7.23

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division

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KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

July 17, 1979

Sample identification
by KVB, Inc.

Test No. 13

Kind of sample reported to us	Bottom Ash
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/19/79
Date received	7/12/79

Analysis report no. 71- 35639

% Combustible, dry basis 18.58

Respectfully submitted,
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R. A. HOUSER, Manager, Midwest Division

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6176 Olson Memorial Highway
Minneapolis, MN 55422

July 17, 1979

Sample identification by KVB, Inc.

Test No. 14

Kind of sample reported to us	Bottom Ash
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/20/79
Date received	7/12/79

Analysis report no. 71- 35636

% Combustible, dry basis 30.93

Respectfully submitted,
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R. A. HOUSER, Manager, Midwest Division

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OFFICE TEL. (312) 264-1173

KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

July 17, 1979

Sample identification by KVB, Inc.

Kind of sample reported to us	Bottom Ash
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/28/79
Date received	7/12/79

Test No. 15

Analysis report no. 71- 35643

% Combustible, dry basis	24.09
% Sulfur, dry basis	0.51

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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OFFICE TEL. (312) 264-1173

KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

July 17, 1979

Sample identification
by KVB, Inc.

Test No. 16

Kind of sample reported to us	Bottom Ash
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/30/79
Date received	7/12/79

Analysis report no. 71- 35642

% Combustible, dry basis	18.97
% Sulfur, dry basis	0.31

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

R. A. HOUSER, Manager, Midwest Division

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OFFICE TEL. (312) 264-1173

KVB
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

June 28, 1979

Sample identification
by KVB

Test No. 1
Sample: Multclone Ash
Test Site: J

Kind of sample reported to us	Ash
Sample taken at	----
Sample taken by	KVB
Date sampled	----
Date received	6/23/79

Analysis report no. 71-34548

	Dry Basis
%Ash.........................	70.14
%Combustible.................	29.86

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

RAHouser

R. A. HOUSER, Manager, Midwest Division

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SINCE 1908

PLEASE ADDRESS ALL CORRESPONDENCE TO:
16130 VAN DRUNEN RD., SOUTH HOLLAND, IL 60473
OFFICE TEL. (312) 264-1173

KVB
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

June 28, 1979

Sample identification
by KVB

Test No. 2
Sample: Multclone Ash
Site: J

Kind of sample reported to us	Ash
Sample taken at	----
Sample taken by	KVB
Date sampled	----
Date received	6/23/79

Analysis report no. 71-34532

	Dry Basis
%Ash........................	87.91
%Combustible.................	12.09

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

LAHouser
R. A. HOUSER, Manager, Midwest Division

American Council of Independent Laboratories Inc.
Charter Member

Original Copy Watermarked
For Your Protection

RAH/ br

COMBUSTIBLES DATA SHEET

SITE J

Crucible Number	Sample Origin	Crucible Weight grams	Crucible & Sample Weight Post 110°C gms	Sample Weight grams	Post 750°C grams	Δ Weight grams	% Combus-tibles
25	TEST #1	9.6889	9.8850	0.1961	9.8325	.0525	26.7
	Side J	9.6889	9.8850		9.8326		
	BLR OUT	9.6891	—		—		
	AVG.	9.6889	9.8850		9.8325		
26	TEST #2	10.2368	10.9118	0.6750	10.7432	0.1686	24.9
	BLR OUT	10.2370	10.9120		10.7434		
		10.2369	—		—		
	AVG.	10.2369	10.9119		10.7433		
27	TEST #5	9.4131	9.6644	0.2511	~~10.3747~~	0.0597	23.7
	BLR OUT	9.4132	9.6643		9.6045		
		9.4132	—		9.6047		
	AVG.	9.4132	9.6643		9.6046		
29	TEST #6	10.2774	11.5592	1.2820	11.2150	0.3442	26.8
	BLR OUT	10.2772	11.5594		11.2152		
		10.2773	—		—		
	AVG.	10.2773	11.5593		11.2151		
33	TEST #7	10.2320	10.5351	0.3031	10.4604	0.0749	24.7
	BLR OUT	10.2321	10.5353		10.4602		
		10.2323	—		—		
	AVG.	10.2321	10.5352		10.4603		
37	TEST #8	10.2072	10.4690	0.2618	10.3747	0.0945	56.0
	BLR OUT	10.2073	10.4692		10.3746		
		10.2073	—		—		
	AVG.	10.2073	10.4691		10.3746		
40	TEST #9	9.2519	9.4155	0.1636	9.3661	0.0493	30.1
	BLR OUT	9.2521	9.4157		9.3664		
		9.2521	—		—		
	AVG.	9.2520	9.4156		9.3663		
	AVG.						
	AVG.						
	AVG.						
	AVG.						

KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 1

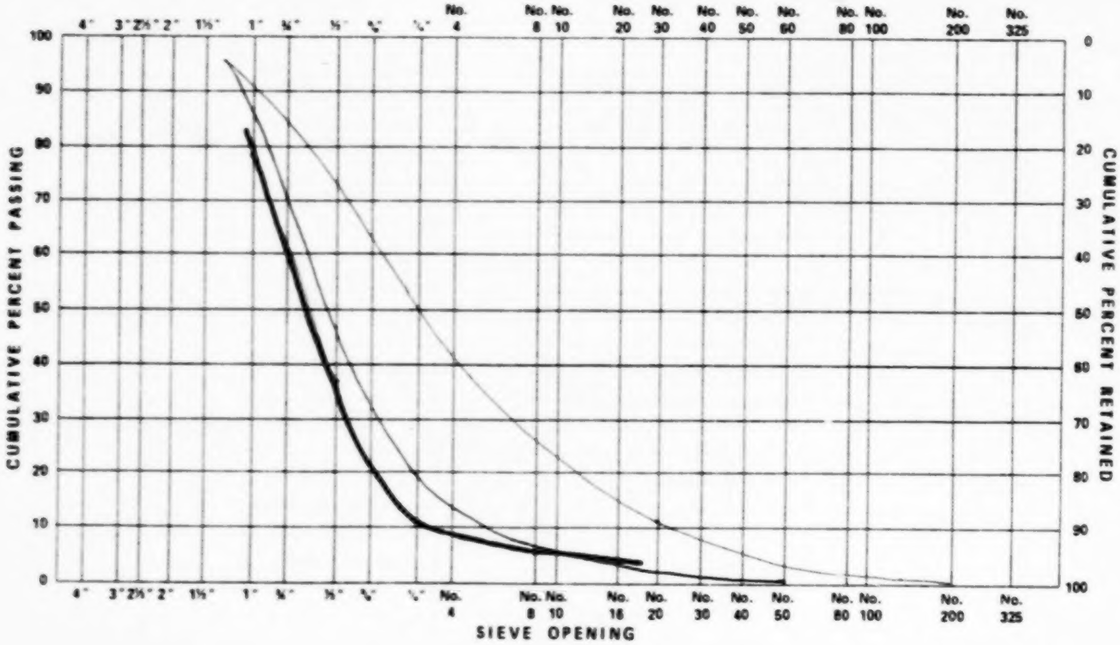
DATE SAMPLE TAKEN 6-3-79

TEST SITE J

TEST PERFORMED BY J.O.B

SAMPLE IDENTIFICATION Ohio

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	109.3	559.2 770.7	1111.3	22.5	4944.7	100.0	5
1"	↓	1155.2 1124.0	2060.6	41.7	3833.4	77.5	5
1/2"		748.4 707.2	1237.0	25.0	1772.8	35.8	5
1/4"		387.9	278.6	5.6	535.8	10.8	5
#8		150.0	40.7	0.8	257.2	5.2	5
#16		325.8	216.5	4.4	216.5	4.4	5



KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 2

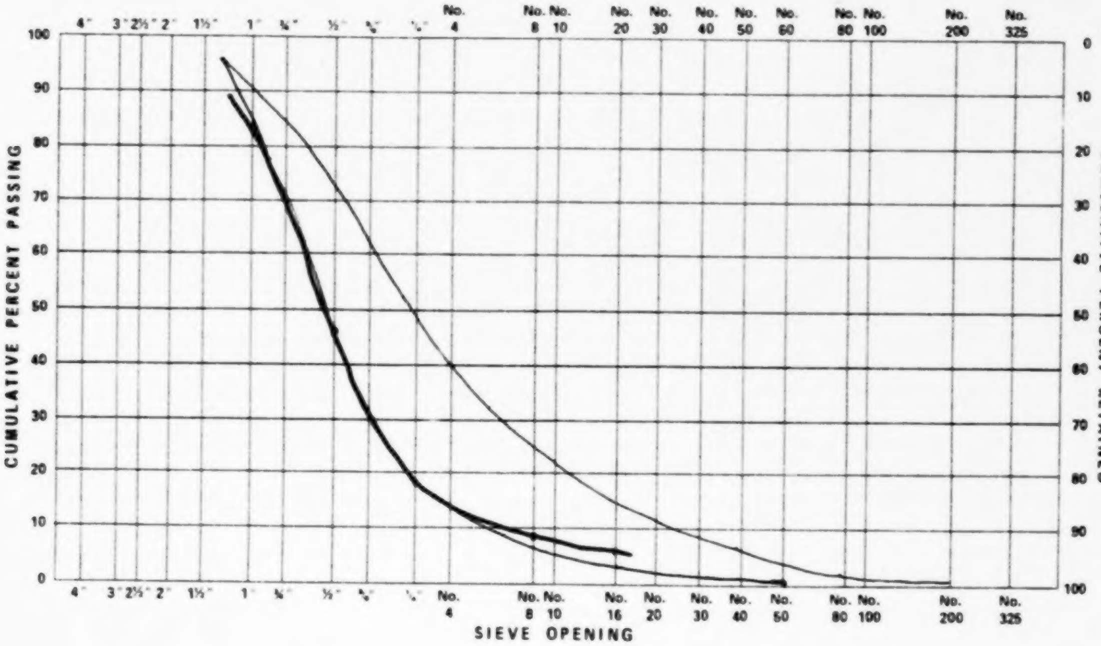
DATE SAMPLE TAKEN 6-4-79

TEST SITE J

TEST PERFORMED BY JOB

SAMPLE IDENTIFICATION Ohio

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
TOP	109.8	594.3 538.1	912.8	16.4	5553.5	100.0	5
1"		1131.4 1224.0	2135.8	38.5	4640.7	83.5	5
½"		819.8 907.4	1507.6	27.1	2504.9	45.0	5
¼"		345.7 406.5	532.6	9.6	997.3	17.9	5
#8		250.2	140.4	2.5	464.7	8.3	5
#16	↓	434.1	324.3	5.8	324.3	5.8	5



KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 5

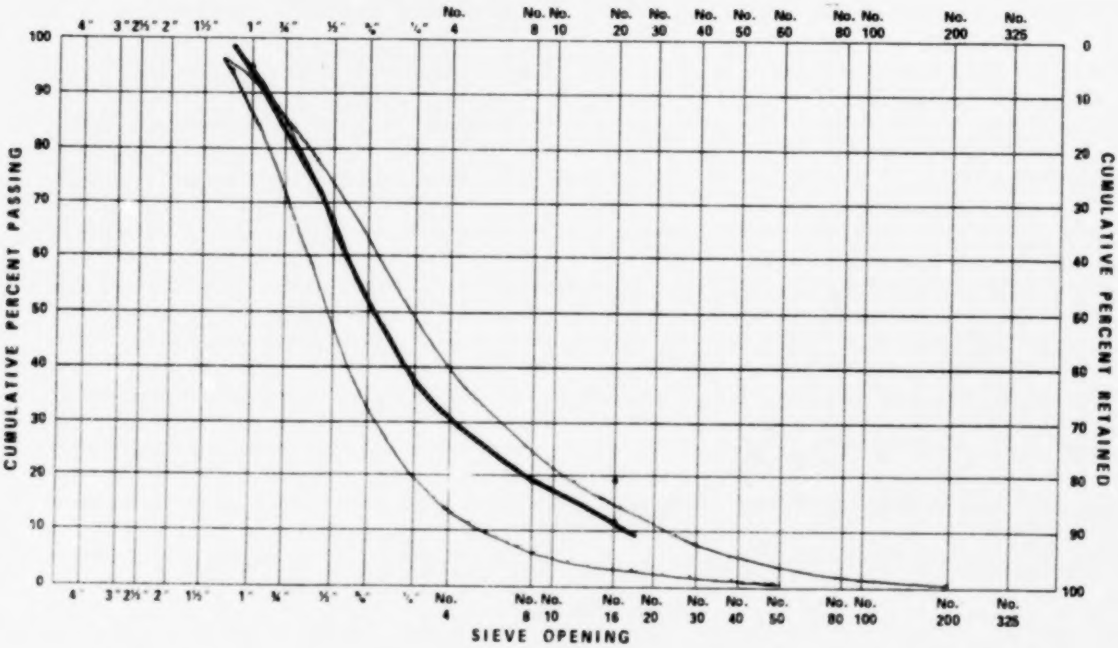
DATE SAMPLE TAKEN 6-12-79

TEST SITE J

TEST PERFORMED BY JOB

SAMPLE IDENTIFICATION Ohio

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
TOP	109.0	448.2	339.2	5.9	5710.7	100.0	5
1"	↓	764.5 990.2	1536.7	26.9	5371.5	94.2	5
½"		778.8 1167.0	1727.8	30.3	3834.8	67.3	5
¼"		1123.0	1014.0	17.8	2107.0	37.0	5
#8		548.0	439.0	7.7	1093.0	19.2	5
#16		763.0	654.0	11.5	654.0	11.5	5



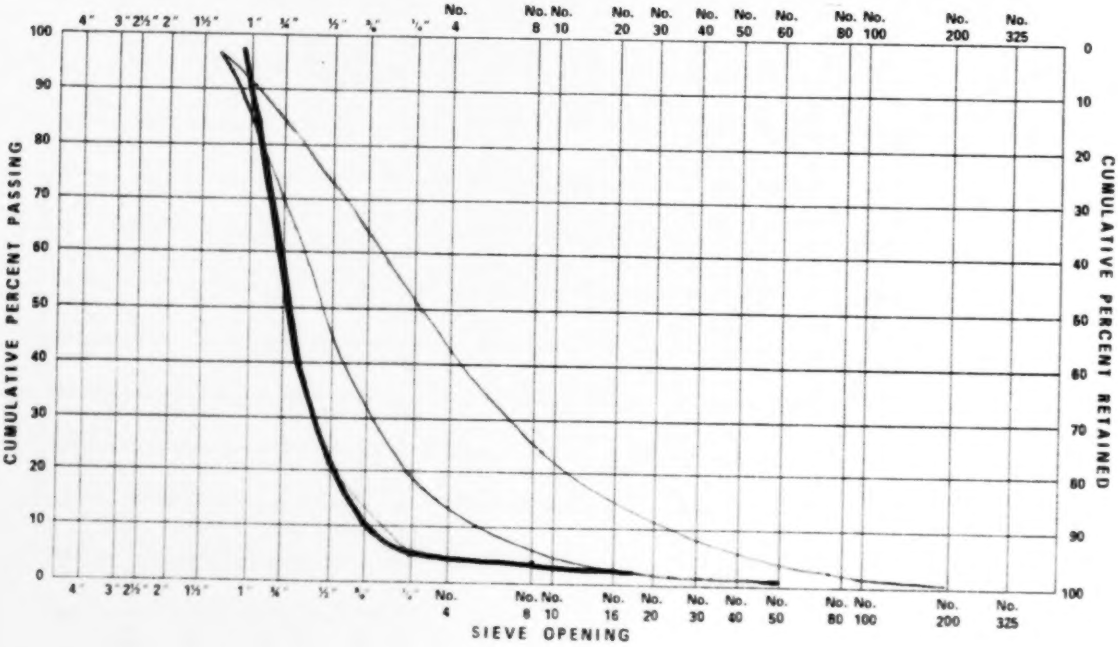
KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 6
TEST SITE 4
SAMPLE IDENTIFICATION Kentucky Coal

DATE SAMPLE TAKEN 6-13-75
TEST PERFORMED BY JWB

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
TOP	109.6	262.2 520.6	563.6	9.4	5994.5	100.0	5
1"	↓	1817.4 1232.5 1464.5	4185.6	69.8	5430.9	90.6	5
½"		804.8 373.0	958.6	16.0	1245.3	20.8	5
¼"		199.0	89.4	1.5	286.7	4.8	5
#8		133.1	23.5	0.4	197.3	3.3	5
#16		283.4	173.8	2.9	173.8	2.9	5



KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 7

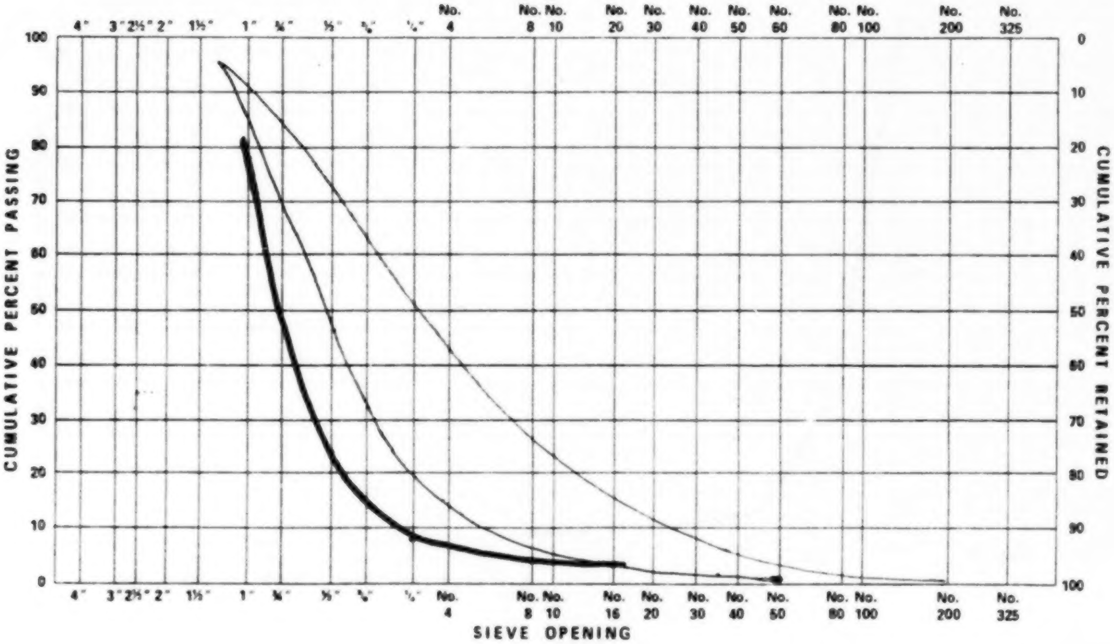
DATE SAMPLE TAKEN 6-4-75

TEST SITE J

TEST PERFORMED BY JOB

SAMPLE IDENTIFICATION Ohio

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	109.0	818.7 600.0	1200.7	22.6	5324.0	100.0	5
1"	↓	1385.1 1309.9 378.3	2855.3	53.6	4123.3	77.4	5
½"		685.5 405.3	872.8	16.4	1268.0	23.8	5
¼"		295.0	186.0	3.5	395.2	7.4	5
#8		142.9	33.9	0.6	209.2	3.9	5
#16		284.3	175.3	3.3	175.3	3.3	5



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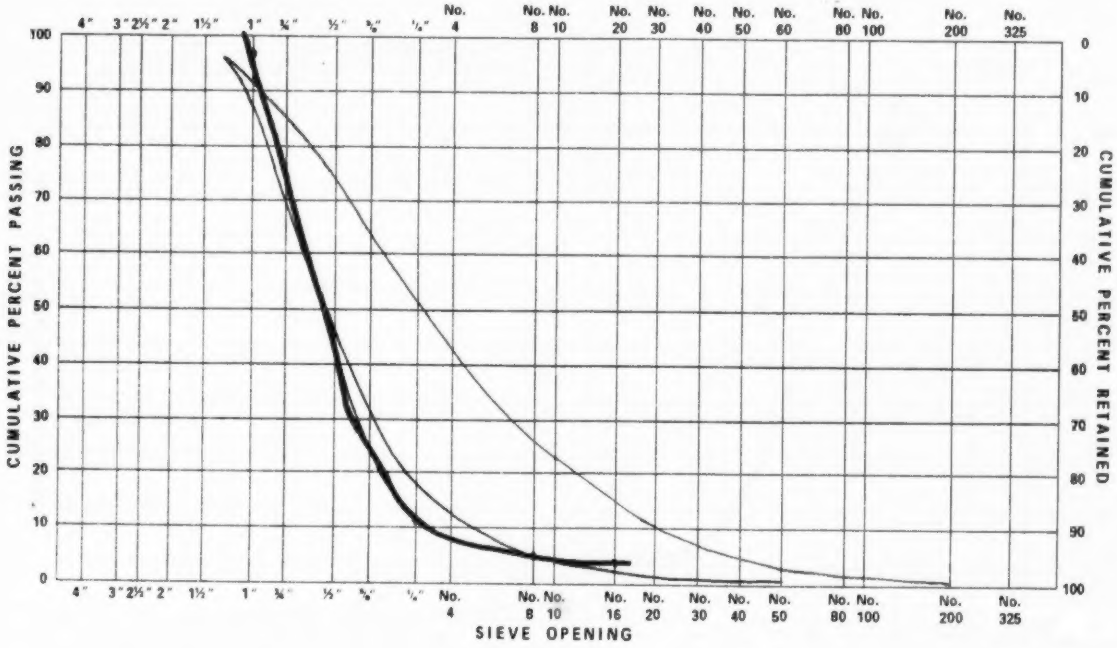
KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 8
DATE SAMPLE TAKEN 6-15-79
TEST SITE J
TEST PERFORMED BY J.B
SAMPLE IDENTIFICATION Kentucky

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	1092	208.0 174.7	164.3	3.0	5452.0	100.0	5
1"	↓	1826.7 1248.4	2856.7	52.4	5287.7	97.0	5
½"		1141.8 914.3	1837.7	33.7	2431.0	44.6	5
¼"		423.4	314.2	5.8	593.3	10.9	5
#8		160.8	51.6	0.9	279.1	5.1	5
#16	↓	336.1	227.5	4.2	227.5	4.2	5



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KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 9

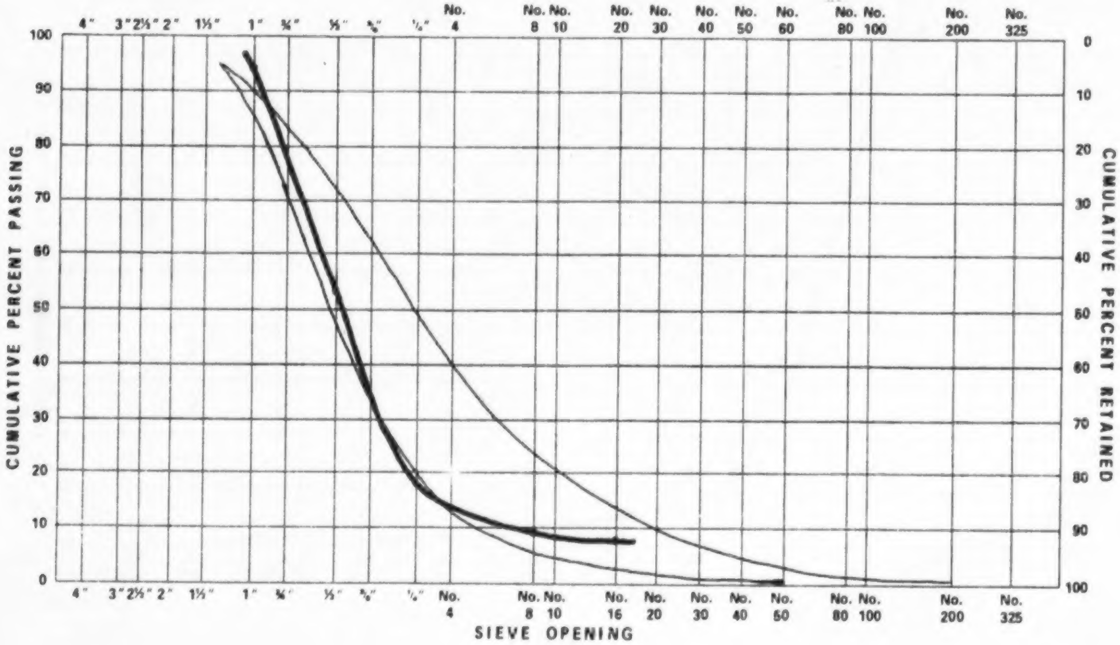
DATE SAMPLE TAKEN 6-16-79

TEST SITE J

TEST PERFORMED BY JOB

SAMPLE IDENTIFICATION Kentucky Coal

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	109.7	191.4 339.1	311.1	5.9	5245.7	100.0	5
1"	↓	1304.4 1061.9	2146.9	40.9	4934.6	94.0	5
½"		1259.6 801.9	1842.1	35.1	2787.7	53.1	5
¼"		557.4	447.7	8.5	945.6	18.0	5
#8		221.7	112.0	2.1	497.9	9.5	5
#16		495.6	385.9	7.4	385.9	7.4	5



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SIEVE ANALYSIS TEST REPORT

TEST NO. 13

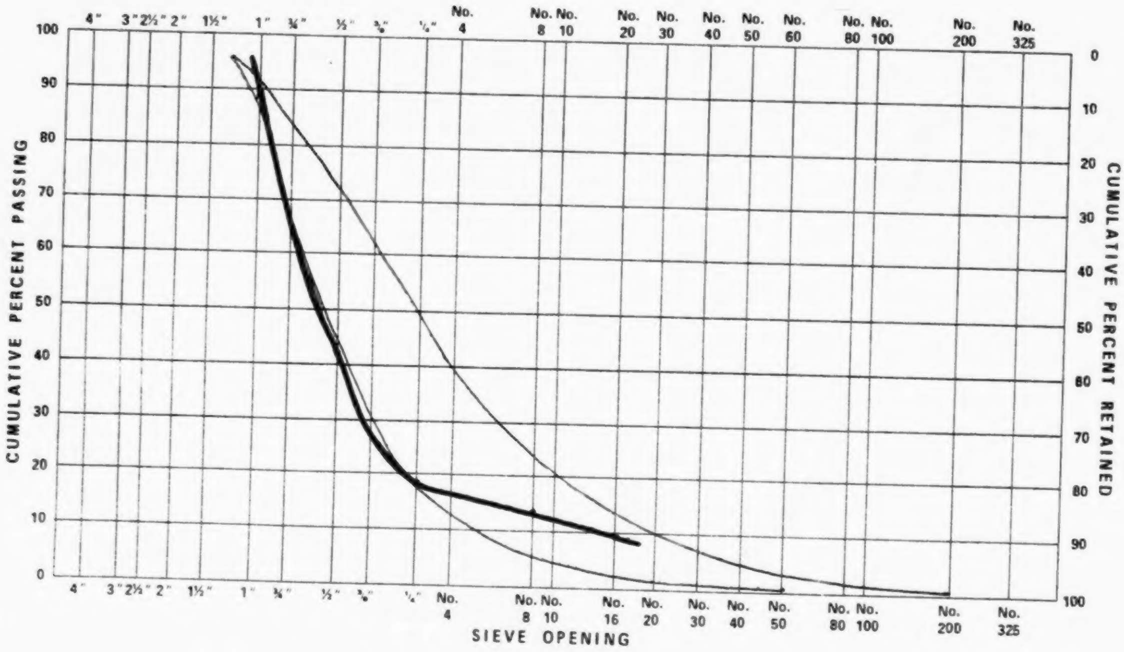
TEST SITE J

SAMPLE IDENTIFICATION Ohio

DATE SAMPLE TAKEN 6-19-79

TEST PERFORMED BY JCB

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
TOP	109.3	497.7 276.6	555.7	10.5	5276.0	100.0	5
1"		1102.6 1581.4	2465.4	46.7	4720.3	89.5	5
1/2"		732.0 776.3	1289.7	24.4	2254.9	42.8	5
1/4"		382.2	272.9	5.2	965.2	18.4	5
#8		280.9	171.6	3.3	692.3	13.2	5
#16		630.0	520.7	9.9	520.7	9.9	5



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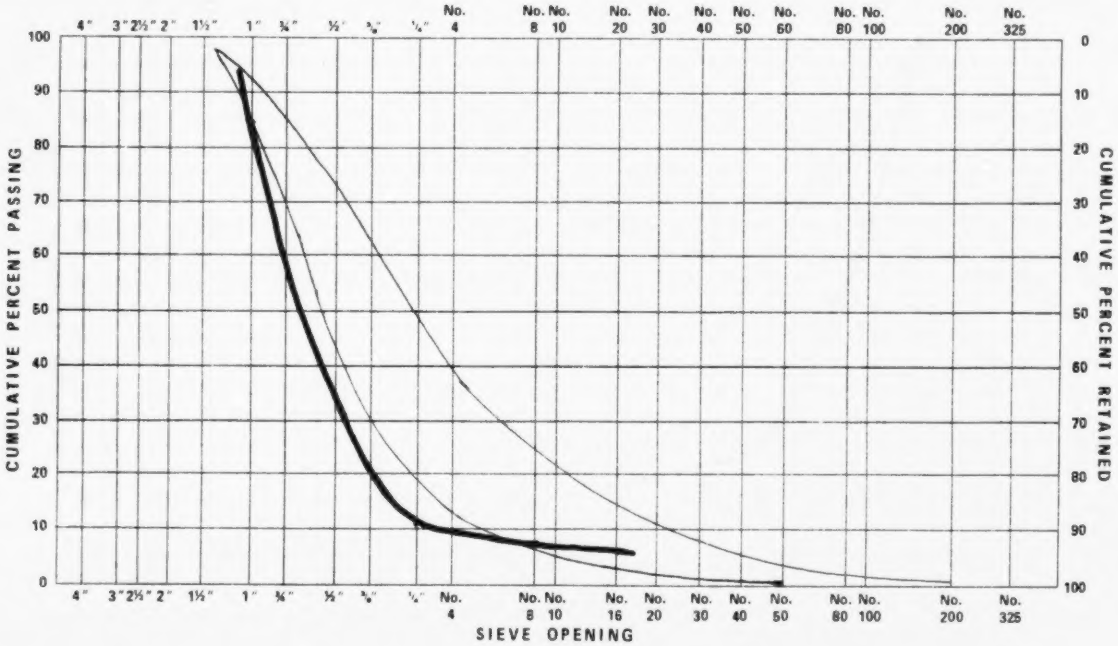
SIEVE ANALYSIS TEST REPORT

TEST NO. 14
DATE SAMPLE TAKEN 6-20-79
TEST SITE J
TEST PERFORMED BY JB
SAMPLE IDENTIFICATION Ohio

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	109.4	329.2 540.0	650.4	15.6	4171.8	100.0	5
1"	↓	1048.2 1222.2	2051.6	49.2	3521.4	84.4	5
1/2"		635.9 594.7	1011.8	24.3	1469.8	35.2	5
1/4		285.7	176.3	4.2	458.0	10.9	5
#8		169.3	59.9	1.4	281.7	67	5
#16		331.2	221.8	53	221.8	5.3	5



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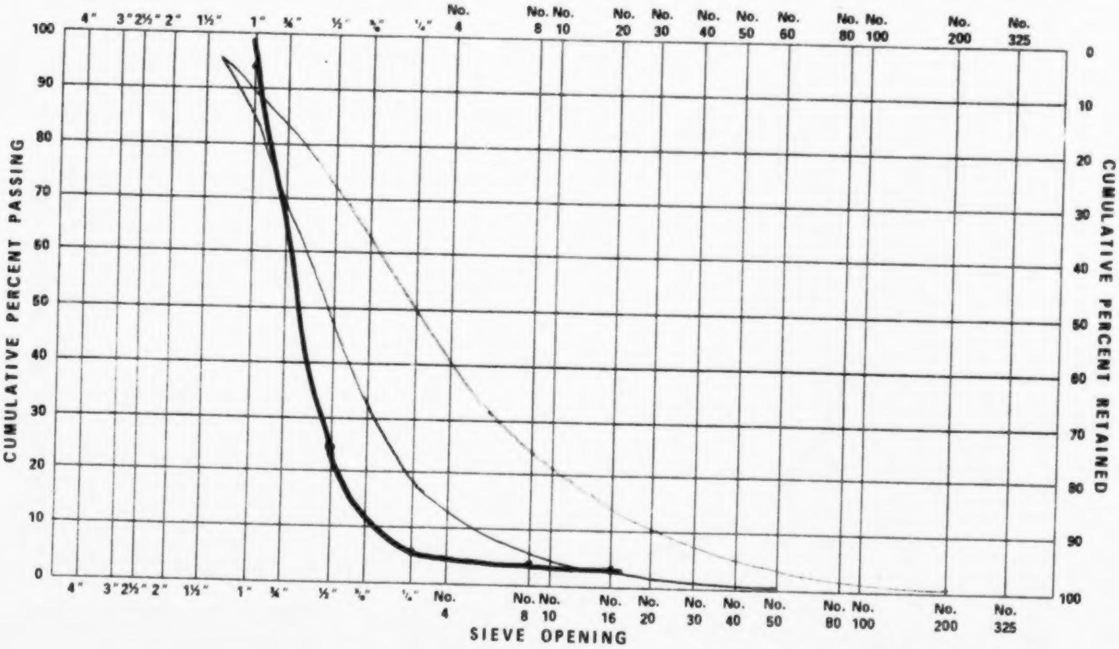
KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 15
DATE SAMPLE TAKEN 6-28-79
TEST SITE J
TEST PERFORMED BY JOB
SAMPLE IDENTIFICATION Kentucky

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
TOP	109.5	185.4 427.7	394.1	6.0	6850.1	100.0	5
1"		1696.5 1238.1 1367.0 728.6	4592.2	70.1	6156.0	94.0	5
½"		608.1 863.9	1253.0	19.1	1563.8	23.9	5
¼"		208.5	99.0	1.5	310.8	4.8	5
#8		131.5	22.0	0.3	211.8	3.3	5
#16		259.3	189.8	2.9	189.8	3.0	5



KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 16

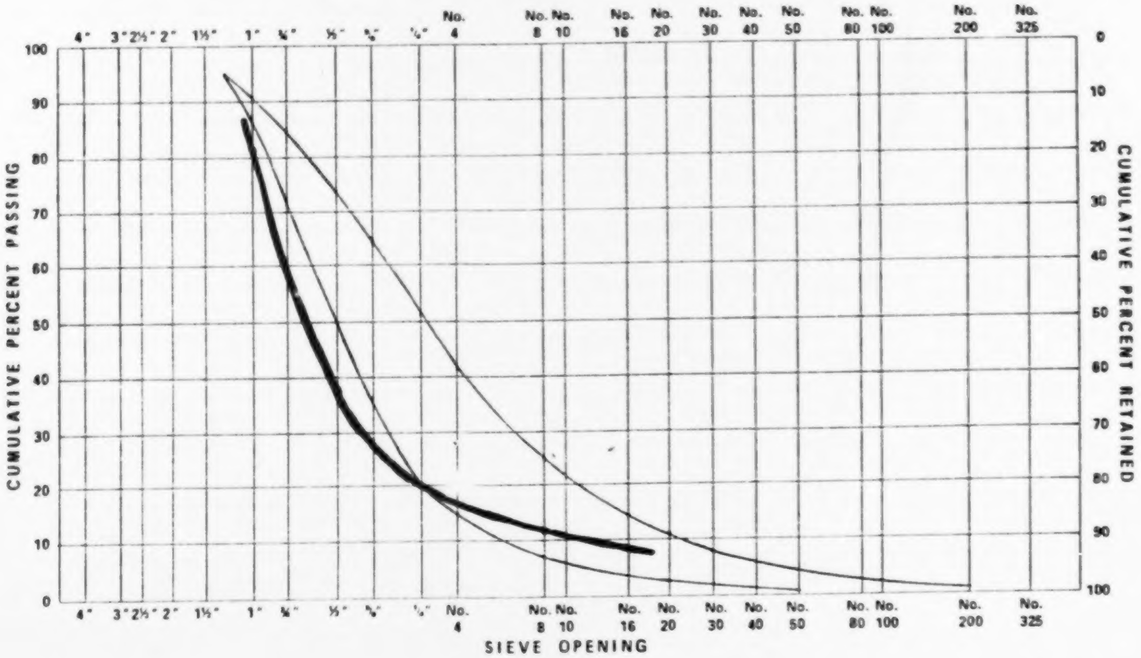
DATE SAMPLE TAKEN 6-30-79

TEST SITE J

TEST PERFORMED BY JOB

SAMPLE IDENTIFICATION Ohio

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
TOP	110.3	844.2 675.3	1298.9	19.1	6817.0	100.0	5
1"	↓	1541.6 1641.3	2962.3	43.5	5518.1	81.0	5
½"	↓	549.0 881.1	1209.5	17.7	2555.8	37.5	5
¼"	↓	668.3	558.0	8.2	1346.3	19.8	5
#8	↓	339.2	228.9	3.4	788.3	11.6	5
#16	↓	669.7	559.4	8.2	559.4	8.2	5

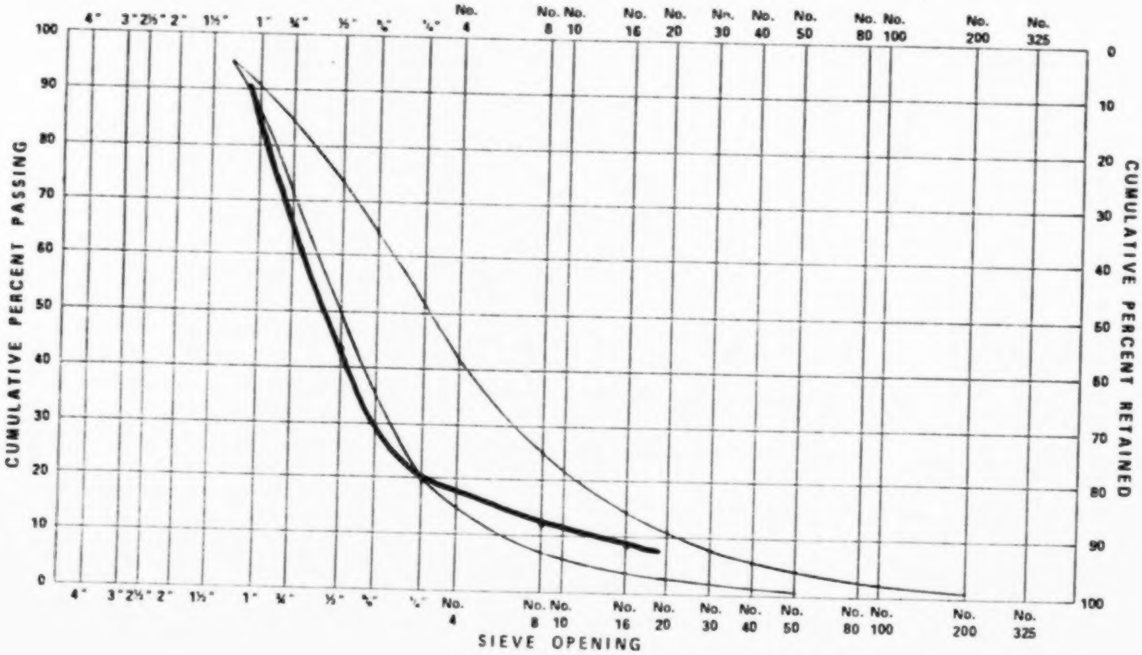


KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. Composite
TEST SITE J
SAMPLE IDENTIFICATION Ohio Coal
DATE SAMPLE TAKEN —
TEST PERFORMED BY JOB

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	110.3	756.2 894.1	1429.7	15.1	9452.8	100.0	5
1"	↓	1650.4 1514.3 1081.9	3915.7	41.4	8023.1	84.9	5
1/2"		994.2 1471.5	2245.1	23.8	4107.4	43.5	5
1/4"		501.1 482.8	763.3	8.1	1862.3	19.7	5
#8		392.5	282.2	3.0	1099.0	11.6	5
#16		927.1	816.8	8.6	816.8	8.6	5



KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. Composite

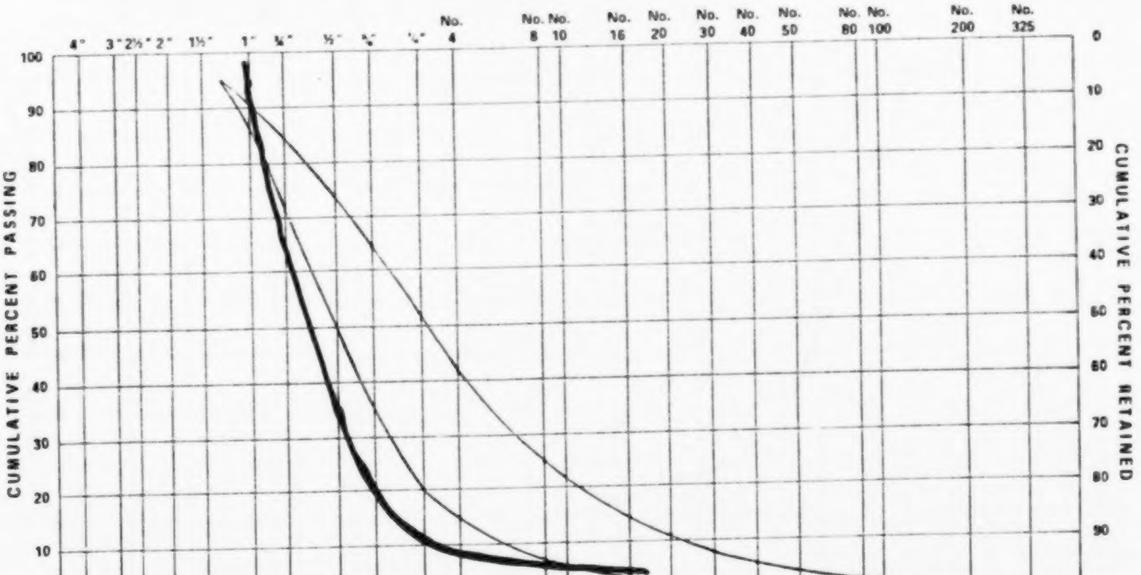
TEST SITE J

SAMPLE IDENTIFICATION Kentucky Coal

DATE SAMPLE TAKEN —

TEST PERFORMED BY JRB

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
TOP	109.5	190.8 339.2	311.0	5.5	5666.1	100.0	5
1"	↓	1507.2 1268.7 965.9	3413.3	60.2	5355.1	94.5	5
1/2"		594.4 997.6	1373.0	24.2	1941.8	34.3	5
1/4"		358.4	248.9	4.4	568.8	10.1	5
#8		176.0	66.5	1.2	319.9	5.7	5
#16		362.9	253.4	4.5	253.4	4.5	5



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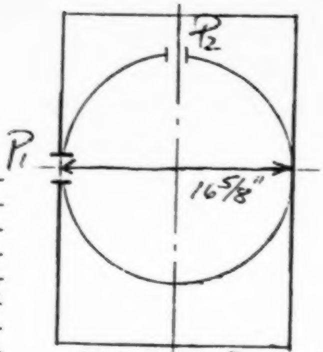
SECTION 6.0

OVERFIRE AND TRAVERSES

PAGE

6.1 OVERFIRE AIR DATA SHEETS 132



OFA setting 30
OFA tap static - ½" H_2O
RH = 33%

OVERFIRE AIR TRAVERSE
SMOKESTACK FLOW PROFILE

TEST NO. 10
LOCATION NO. MAIN DUCT
DATE 6-17-79
SAMPLING LOCATION FRONT OFA
INSIDE OF FAR WALL TO OUTSIDE OF NIPPLE, (DISTANCE A) 19 3/4" BAROMETRIC PRESS, in.Hg 29.36
INSIDE OF NEAR WALL TO OUTSIDE OF NIPPLE, (DISTANCE B) 3⅛" STACK PRESS., Ps, iwg
STACK I.D. (DISTANCE A - DISTANCE B) 16⅝ STK. GAS SP. GRAVITY, G_S
NEAREST UPSTREAM DISTURBANCE
NEAREST DOWNSTREAM DISTURBANCE

TRAVERSE POINT NUMBER	% OF STACK DIAMETER	DISTANCE FROM INSIDE WALL	VELOCITY HEAD (Δp_s), in. H_sO		STACK TEMPERATURE (T_s, °F	OXYGEN %	STACK GAS SPEED, Vs ft/min
			ΔP_1	ΔP_2			
1.	3.2	0.549" + 3⅛ = 3 11/16	0.03	0.03	110		
2.	10.5	1.745 + 3⅛ = 4 7/8	0.03	0.04			
3.	19.4	3.225 + 3⅛ = 6 3/8	0.03	0.04			
4.	32.3	5.370 + 3⅛ = 8½	0.04	0.04			
5.	67.7	11.255 + 3⅛ = 14 3/8	0.04	0.005 *			
6.	80.6	13.40 + 3⅛ = 16½	0.03	0.008 *			
7.	89.5	14.879 + 3⅛ = 18"	0.04	0.008 *			
8.	96.8	16.076 + 3⅛ = 19 3/16	0.01	0.008 *			
9.							
10.							
11.							
12.							
13.							
14.							
15.							
16.							
17.							
18.							
Average							

STACK GAS SPEED, $$V_s = 174\, F_s \sqrt{\overline{\Delta P}\,(T_s + 460)\left(\frac{407}{P_s}\right)\left(\frac{1.00}{G_s}\right)}$$

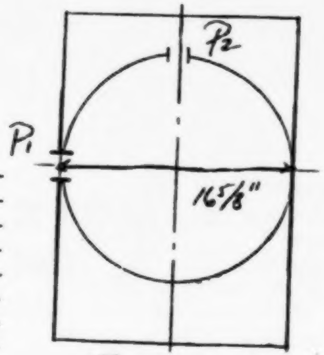
Average

* standard pitot tube used
otherwise S type
(C = 0.837)

60-23
rev. 11/74

OVERFIRE AIR TRAVERES
SMOKESTACK FLOW PROFILE

TEST NO. 11
LOCATION NO. MAIN DUCT
DATE 6-17-79
SAMPLING LOCATION FRONT OFA
INSIDE OF FAR WALL TO 19 3/4"
OUTSIDE OF NIPPLE, (DISTANCE A) ______ BAROMETRIC PRESS, in.Hg 29.36
INSIDE OF NEAR WALL TO 3 1/8"
OUTSIDE OF NIPPLE, (DISTANCE B) ______ STACK PRESS., Ps, iwg ______
STACK I.D. (DISTANCE A - DISTANCE B) 16 5/8 STK. GAS SP. GRAVITY, G_S ______
NEAREST UPSTREAM DISTURBANCE ______
NEAREST DOWNSTREAM DISTURBANCE ______



OFA setting - 60
OFA static 2 1/2 "H_2O
RH = 33%

TRAVERSE POINT NUMBER	% OF STACK DIAMETER	DISTANCE FROM INSIDE WALL	VELOCITY HEAD (Δp_s), in. H_sO		STACK TEMPERATURE (T_s, °F	OXYGEN %	STACK GAS SPEED, Vs ft/min
			ΔP1	ΔP2			
1.	3.2	3 11/16"	0.15	0.11	110		
2.	10.5	4 7/8"	0.16	0.12			
3.	19.4	6 3/8"	0.17	0.11			
4.	32.3	8 1/2"	0.17	0.11			
5.	67.7	14 3/8"	0.12	0.05 *			
6.	80.6	16 1/2"	0.10	0.05 *			
7.	89.5	18 "	0.09	0.03 *			
8.	96.8	19 3/16"	0.08	0.02 *			
9.							
10.							
11.							
12.							
13.							
14.							
15.							
16.							
17.							
18.							
Average							

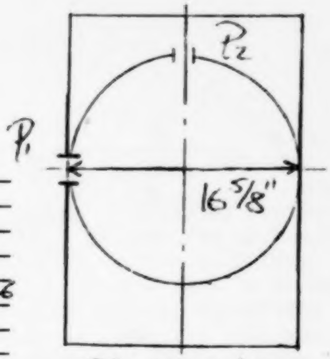
$$\text{STACK GAS SPEED, } V_s = 174\ F_s \sqrt{\overset{\text{Average}}{\Delta P(T_s + 460)}\ \left(\frac{407}{P_s}\right)\ \left(\frac{1.00}{G_s}\right)}$$

* Standard pitot tube used otherwise S type (C = 0.837)

60-23
rev. 11/74

OVERFIRE AIR TRAVERSE
SMOKESTACK FLOW PROFILE

TEST NO. 12
LOCATION NO. MAIN DUCT
DATE 6-17-79
SAMPLING LOCATION FRONT OFA
INSIDE OF FAR WALL TO 19 3/4"
OUTSIDE OF NIPPLE, (DISTANCE A) ______ BAROMETRIC PRESS, in.Hg 29.36
INSIDE OF NEAR WALL TO 3/8"
OUTSIDE OF NIPPLE, (DISTANCE B) ______ STACK PRESS., Ps, iwg ______
STACK I.D. (DISTANCE A - DISTANCE B) 16 5/8 STK. GAS SP. GRAVITY, G_S ______
NEAREST UPSTREAM DISTURBANCE ______
NEAREST DOWNSTREAM DISTURBANCE ______



OFA setting 100
OFA static - 8½" H₂O
RH = 33%

TRAVERSE POINT NUMBER	% OF STACK DIAMETER	DISTANCE FROM INSIDE WALL	VELOCITY HEAD (Δp_s), in. H_sO		STACK TEMPERATURE (T_s, °F	OXYGEN %	STACK GAS SPEED, Vs ft/min
			ΔP_1	ΔP_2			
1.	3.2	3 11/16"	0.32	0.28	108		
2.	10.5	4 7/8"	0.36	0.27	↓		
3.	19.4	6 3/8"	0.44	0.30			
4.	32.3	8 1/2"	0.47	0.33			
5.	67.7	14 7/8"	0.39	0.14 *			
6.	80.6	16 1/2"	0.39	0.14 *			
7.	89.5	18"	0.37	0.10 *			
8.	96.8	19 3/16"	0.30	0.08 *			
9.							
10.							
11.							
12.							
13.							
14.							
15.							
16.							
17.							
18.							
Average							

STACK GAS SPEED, $V_s = 174\, F_s \sqrt{\overset{\text{Average}}{\Delta P}\,(T_s + 460)\,\left(\frac{407}{P_s}\right)\left(\frac{1.00}{G_s}\right)}$

* standard pitot tube used
otherwise S type
(C = 0.837)